T.O. 1F-100C(I)-34-1-1

AIRCREW NONNUCLEAR WEAPON DELIVERY MANUAL

USAF SERIES
F-100C(I), F-100D(I) & F-100F(I)
AIRCRAFT

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This publication replaces Operational Supplements T.O. 1F-100C(I)-34-1-IS-7, -8, -9, -10, -11, -12, -13, -15, -16, and -18, and Safety Supplements ISS-3 and 5.

See T.O. 0-1-1-4 for current status of Delivery Manual, Safety Supplements, Operational Supplements, and Delivery Checklists.

This publication is incomplete without classified supplement, T.O. 1F-100D(I)-34-1-1B.

This publication augments T.O. 1F-100C(I)-34-1-2 dated 31 January 1973.

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GLOSSARY AND REFERENCES

GLOSSARY.

ABOVE GROUND LEVEL (AGL): Vertical distance in feet above ground, usually used to indicate weapon release altitude above a target.

ADVERSE YAW: A yaw opposite to the direction of turn, induced by rolling motion and aileron deflection. The yaw moment is greatest at high lift conditions and full aileron deflections.

AIRCRAFT AXES: There are three axes which are mutually perpendicular and have a common point of intersection. The longitudinal axis of the aircraft is parallel to the fuselage reference line. Rotating the longitudinal axis will change the aircraft angle of attack, and/or pitch. The aircraft vertical axis is perpendicular to the longitudinal axis. The aircraft rotates about this axis when yawing. The aircraft lateral axis is rotated about the longitudinal axis when the aircraft is rolled or banked.

ANGLE OF ATTACK: The angle between the fuselage reference line and the relative wind.

ANGLE OF GUNFIRE (AGF): The angle between the fixed bore line and flight path.

ANGLE OFF: The angular measurement between line of flight of an aerial target and flight path of the attacking aircraft.

ANGLE OF INCIDENCE: A fixed angle between the wing chord line and the fuselage reference line.

ANGLE OF PITCH: The angle of the aircraft flight path, relative to a level plane.

AWRS: Automatic weapon release system.

BOMB TRAJECTORY: The path of a bomb from release to detonation. The trajectory is the result of bomb ballistics, release velocity, release angle, and release height above burst.

BULLET DENSITY: Number of rounds passing through an area of one square foot per unit of time.

BULLET DISPERSION: Deviation of a bullet trajectory from the aiming point.

CORRECTED SIGHT DEPRESSION: True sight depression corrected for a headwind or tailwind component.

EFFECTIVE BORE LINE (EBL): Bullet line of departure, disregarding gravity drop.

EFFECTIVE SIGHT DEPRESSION: The amount of depression represented by the angle formed by the flight path and the depressed sight line. This angle varies as flight conditions vary; however, the angle formed by the mechanical cage sight line and the depressed sight line will remain a constant. Effective and required sight depression will be the same when preplanned flight conditions are met.

ELECTRICAL CAGED SIGHT LINE (ECSL): In electrical cage function, the A-4 sight has a fixed range input of 850 feet and the sight is computing for 1.1 mils of gravity drop from OPSL.

FIXED BORE LINE (FBL) or FIXED GUN LINE: An imaginary line projected through the gun barrel to infinity.

FUSELAGE REFERENCE LINE (FRL): A basic reference line extending through the fuselage, parallel to the longitudinal axis of the aircraft.

HANGFIRE. Failure of a rocket motor in which the igniter fires, but the propellant ignition is delayed for periods up to 15 minutes after completion of the firing circuit. During this hangfire period, the propellant may partially ignite, or smolder.

HARMONIZATION: The adjustment of guns and sight of an aircraft so that, when in flight and within effective range, the tracking index will indicate the impact point of the bullets. Basically, it is the orientation of three reference lines: fuselage reference line, sight line, and fixed bore line.

LAUNCHER LINE (LL): The line along which a rocket is fired from the aircraft.

LINE OF DEPARTURE (LOD): The path that a rocket takes immediately after leaving the aircraft. The LOD is always located in the angle formed by the launcher line and the flight path. The rocket's line of departure is a resultant of the firing velocity of the rocket along the launcher line and the aircraft's speed along the flight path.

LINEAR ACCELERATION: A steady rate of change of velocity.

MIL: An angular measurement which subtends one foot at 1,000 feet (17.78 mils in one degree).

MISFIRE: Failure of a rocket motor to fire, for any reason, after completion of the firing circuit.

PARALLAX ERROR: Error induced by the linear separation of the sight and guns as they are installed in the aircraft.

PYLON: A component, attached to an aircraft, which will carry, release, or jettison external stores.

REQUIRED SIGHT DEPRESSION: The amount of depression below the flight path necessary to produce an effective sight picture – determined by flight conditions of dive angle, airspeed, and release altitude.

SIGHT PICTURE: The relationship of the tracking index to the target, as it appears to the pilot.

TER: Triple ejector rack. (F-100D Aircraft only).

TRACKING INDEX: The aiming point, pipper, cross, etc., used by the pilot in weapons delivery.

TRAJECTORY SHIFT: The angular deviation of the bullet trajectory from fixed bore toward the flight path of the aircraft.

TRUE SIGHT DEPRESSION: A no-wind sight setting computed for preplanned release conditions.

TRUE ZERO PREDICTION SIGHT LINE (TOPSL): The base, or zero, line for all sight computations before parallax correction.

ZERO PREDICTION SIGHT LINE (OPSL): A sight line which has been depressed to correct for parallax and becomes the base, or zero, line for all sight computations.

REFERENCES.

T.O. NO.	TITLE
IF-100C(I)-1	Flight Manual
1F-100D(I)-1	Flight Manual
1F-100C-33-1-1	Conventional Munitions Basic Information
1F-100C-33-1-2	Conventional Munitions Loading Procedures
1F-100D(I)-33-1-1	Nonnuclear Munitions Basic Information
1F-100D(I)-33-1-2	Nonnuclear Munitions Loading Procedures
1F-100C(I)-2-7	Radio and Radar
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1F-100F(I)-2-8	Radio and Radar
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10A1-2-3-1	Opr and Svc Instr – Gun Camera System Type N-9, KB-3A, and Motion Picture Camera Body, Type LB-27B (Bell & Howell)
10D1-2-16-1	Instr with P/B – Projector, Motion Picture, Silent, 16MM, Type AQ-8A
11-1-28	Bombs, Fins, Fuzes, Arming Wires and Related Components
11-1-30	Tactical Munitions Manual for Rockets and Missiles
11-1-31	Tactical Munitions Manual for Small-Arms Ammunition
11-1-32	Tactical Munitions Manual for Dispensers, Bombs and Fuzes
11A-1-39	Ammunitions for Acft Guns
11A-1-55	Fire Fighting and Withdrawal, Time Distance and Related Criteria for Explosives (Except Nuclear Weapons)
11A1-2-3-1	Opr, Svc and Repair Instr – Mark 24 Flare Dispenser, Type SUU-25/A

T.O. NO.	TITLE
11A1-2-4-1	Opr, Svc, Repair Instr with P/B – Flare Dispenser, Type SUU-25B/A
11B81-2-3	Pylon Technical Manual, Overhaul, External Store Pylons, Ejector Racks, and Release Mechanisms.
11F35-2-10-11	Opr Instr – Radar Set, Type AN/APG-30A
11F39-2-3-1	Opr Instr – Gyro Computing Sight, (Gun-Bomb-Rocket), Types A-4, -4A
11L1-3-20-1	Opr and Handling Instr for the Rocket Launcher, LAU-32A/A
11L1-3-21-1	Opr Instr – Rocket Launcher, Type LAU-3/A
11L1-3-25-1	Opr and Field Maint Instr with IPB – Launcher; Rocket Airborne, Type LAU-59/A
21M-AIM9B-101	Operational Data – AIM-9B, -9E
21M-AIM9B-105	Performance Manual – AIM-9B
21M-AIM9E-101	Performance Manual – AIM-9E
	Field Service Training Manual, A-4 Gyro Computing Sight, A.C. Sparkplug Division, General Motors

T.O. NO.	TITLE
	Final Engineering Report on Sidewinder System Studies (Secret), Westinghouse Electric Corporation, 14 Feb 58
	NAVORD OD 12663, Sidewinder 1 and 1A Performance Handbook, 21 Jan 58 (CONFIDENTIAL)
	NAVORD Report 4914, Jan 58, Pilot's Handbook for sidewinder 1 and 1A
	NAVORD Report 5631 (CONFIDENTIAL), Range and Mach Number Curves for Sidewinder 1 and 1A
	NAVORD Report 5808. The Sidewinder Pilot Looks at the Maneuvering Target, (SECRET), 2 Dec 57
	NOTS 1416, Sidewinder 1, Sept 56 (CONFIDENTIAL)
	Project Report 58-4 TR and D, Nellis AFB, Nev., Techniques and Procedures for F-100D/F Employment of GAR-8 (SECRET)

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SUPPLEMENT SUMMARY

Safety Supplements are numbered as follows: 1SS-1, 1SS-2, etc. Operation Supplements are numbered 1S-1, 1S-2, etc. The supplements you receive should follow in sequence, and if you find you are missing one, check T.O. 0-1-1-4 to see whether the supplement was issued and, if so, is still in effect. It may have been replaced or rescinded before you received your copy. If it is still active, see your Publication Distribution Officer and get your copy. It should be noted that a supplement number will never be used more than once.

SUPPLEMENTS REPLACED BY THIS CHANGE OR RESCINDED

NUMBER	DATE	SHORT TITLE	DISPOSITION
1S-1	2 Feb 1970	Information on SUU-20A/A	Section I & II
1S-2	12 June 1970	Deletion of BLU-32/B Fire Bomb Information	Section I & II
1S-3	18 June 1970	Information on CBU-52/B Dispenser	Section I

ACTIVE SUPPLEMENTS

Supplements outstanding at the time of preparation of this page have been listed below for your convenience.

NUMBER	DATE	SHORT TITLE
1S–6	25 Nov 70	Revised Arming Wire Installation for M117(R) and MK–82 Snakeye Bombs (Replaces –5)

FOREWARD

COMMAND REVIEW PRODUCT.

This Delivery Manual reflects decisions made by the using commands at the Command Review Conference. If you have any question concerning its content, especially regarding procedures, your inquiry should be directed to your Command Headquarters. Remember, this Delivery Manual has not been tailored to the requirements of one command. It must reflect some compromises to satisfy the maximum possible requirements of all commands involved.

SCOPE.

This Aircrew Nonnuclear Weapon Delivery Manual provides tactical pilots with information required to perform all types of F-100C/D/F delivery missions employing nonnuclear weapons. Weapon delivery techniques or tactics are not included except in a general vein to describe a particular delivery maneuver or to support certain ballistics data. This publication contains the data required to plan a combat attack and/or practice mission using the F-100C, F-100D and F-100F Airplanes and the following munitions and associated equipment.

NOTE

The F-100C, D and F Flight Manuals are the authoritative document for certification of stores.

Munitions.

Ammunition, 20-millimeter
Missile, AIM-9B, -9E, -9J
Rocket, 2.75-inch FFAR
Bomb, GP, M-65A1
Bomb, GP, M117
Bomb, GP, M117 (retarded)
Bomb, GP, MK-81
Bomb, GP, MK-82
Bomb, GP, MK-83
Bomb, GP, MK-82 (Snakeye I)
Bomb, gas, MC-1
Bomb, leaflet, M129E1
Bomb, Demolition, BLU-31/B
Munition, KMU-342/B
Bomb, fire, BLU-1/B, A/B, B/B, C/B
Bomb, fire, BLU-27/B, B/B, C/B
Bomb, fire, BLU-32A/B, B/B, C/B
Bomb, chemical, BLU-52/B
Destructor, MK-36 Mod O
Dispenser, CBU series
Tank leaflet, MK-12 Mod O

Associated Equipment.

Gun, M-39
Launcher, LAU-3/A
Launcher, LAU-32A/A, B/A
Launcher, LAU-59/A
Launcher, LAU-68A/A
Dispenser, SUU series
Dispenser, Flare/Marker SUU-25A/A, B/A, C/A, E/A
Flare, MK-24 Mod 4
Marker, LUU-1/B, LUU-2/B, LUU-5/B.
Bomb, practice container, B37K-1
Bomb, practice, BDU-33 (series)
Bomb, practice, MK-106
Target, dart system, A/A37U-15
Rocket, Target, TDU-11/B

Descriptive and procedural data pertaining to classified weapons is contained in T.O. 1F-100D(I)-34-1-1B.

HOW TO BE ASSURED OF HAVING LATEST DATA.

Refer to T.O. 0-1-1-4, which lists all current Delivery and Flight Manuals, Safety Supplements, Operational Supplements, and Checklists. Its frequency of issue and brevity insure an accurate, up-to-date listing of these publications.

SUPPLEMENTS.

The current status of each Supplement affecting your airplane can be determined by referring to T.O. 0-1-1-4. The title page of the Delivery Manual and the title block of each Supplement should also be checked to determine the effect they may have on existing Supplements. You must remain constantly aware of the status of all Supplements; current Supplements must be complied with, but there is no point in restricting your operation by complying with a replaced or rescinded Supplement. Upon receiving each Supplement, file it in the front of your Delivery Manual, and make reference to it on the Supplement Summary page. If existing Delivery Manual information or procedures are revised, a reference to the applicable Supplement should then be written in the margin of the page opposite the affected writeup.

A Safety Supplement may be replaced by an Operational Supplement or an Operational Supplement may be replaced by a Safety Supplement.

Safety Supplements.

Information involving safety will be promptly forwarded to you by Safety Supplements. Supplements covering loss of life will get to you in 48 hours by TWX, and those concerning serious damage to equipment within 10 days by mail.

Operational Supplements.

Nonsafety requirements or airplane changes affecting flight crew information that is not timely, or cannot be practically or adequately covered in the Delivery Manual at the time of a scheduled change or revision will be forwarded to you by Operational Supplements.

CHECKLISTS.

The Delivery Manual contains only amplified checklists. Abbreviated checklists have been issued as separate technical orders. (Refer to the back of the title page for the T.O. number and date of your latest checklist.) Line items in the Delivery Manual and checklists are identical with respect to arrangement and item number. Whenever a Supplement affects the abbreviated checklist, write in the applicable change on the affected checklist page. As soon as possible, a new checklist page, incorporating the supplement, will be issued. This will keep handwritten entries of Supplement information in your checklist to a minimum.

HOW TO OBTAIN COPIES.

The required quantities should be ordered before you need them to assure their prompt receipt. Check with your supply personnel; it is their job to fulfill your Technical Order requests. Basically, you must order the required quantities on the Publication Requirements Table (T.O. 0-1-1-4). Technical Orders 00-5-1 and 00-5-2 give detailed information for properly ordering these publications. Make sure a system is established at your base to deliver these publications to the flight crews immediately upon receipt.

DELIVERY MANUAL AND CHECKLIST BINDERS.

Looseleaf binders and sectionalized tabs are available for use with your manual. These are obtained through local purchase procedures. Binders are also available for carrying your abbreviated checklist. These binders contain plastic envelopes into which individual checklist pages are inserted. They are available in three capacities: 15, 25, and 40 envelopes. Check with your supply personnel for assistance in securing these items.

WARNINGS, CAUTIONS, AND NOTES.

The following definitions apply to Warnings, Cautions, and Notes found throughout the manual.

WARNING

Operating procedures, practices, etc, which will result in personal injury, or loss of life, if not correctly followed.

CAUTION

Operating procedures, practices, etc., which if not strictly observed, will result in damage to, or destruction of, equipment.

NOTE

An operating procedure, condition, etc., which it is essential to highlight.

YOUR RESPONSIBILITY – TO LET US KNOW.

Every effort is made to keep the Delivery manual current. Review conferences with operating personnel and a constant review of accident and flight test reports assure inclusion of the latest data in the manual. However, we cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections and questions regarding this manual or any phase of the Delivery Manual program are welcomed. AF Form 847 will be used for recommending changes to the Delivery Manual in accordance with instructions in AFR 60-9 and T.O. 00-5-1. These will be forwarded through Command Headquarters to SMALC, McClellan AFB, CA 95652, ATTN: MMSRBD. All comments and questions transmitted by means other than the AF Form 847 will be submitted directly to the Flight Manual Manager, SMALC, Mc Clellan AFB, CA 95652, ATTN: MMSRBD.

DEFINITIONS OF WORDS "SHALL," "WILL," "SHOULD," AND "MAY."

The words "shall" and "will" indicate a mandatory requirement. The word "should" indicates a nonmandatory desire or preferred method of accomplishment. The word "may" indicates an acceptable or suggested means of accomplishment.

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ATTACK AND DELIVERY.

Aerial Attack – 20 MM Guns. A 20 mm gun attack (figure 1-1) against an aerial target is normally executed while in pursuit curve; however, the attack may be executed in almost any airspeed state or condition and at any altitude within the capabilities of the airplane. Although the gunsight may make it possible to track the target from a range as great as 5,000 to 6,000 feet, it is usually necessary to close to a range of 3,500 feet or less because of the limited effective range of the guns. Accomplishing a successful attack against a maneuvering target requires maneuvering with the target and track long enough to permit the computing sight to reach a tracking solution. In this instance, a short range and small angle-off are desirable, inasmuch as tracking can be accomplished much more accurately and, for the guns, dispersion is not so great. Conversely, when attacking a bomber-type airplane, it is advisable to fire from maximum effective gun range at a high angle-off to

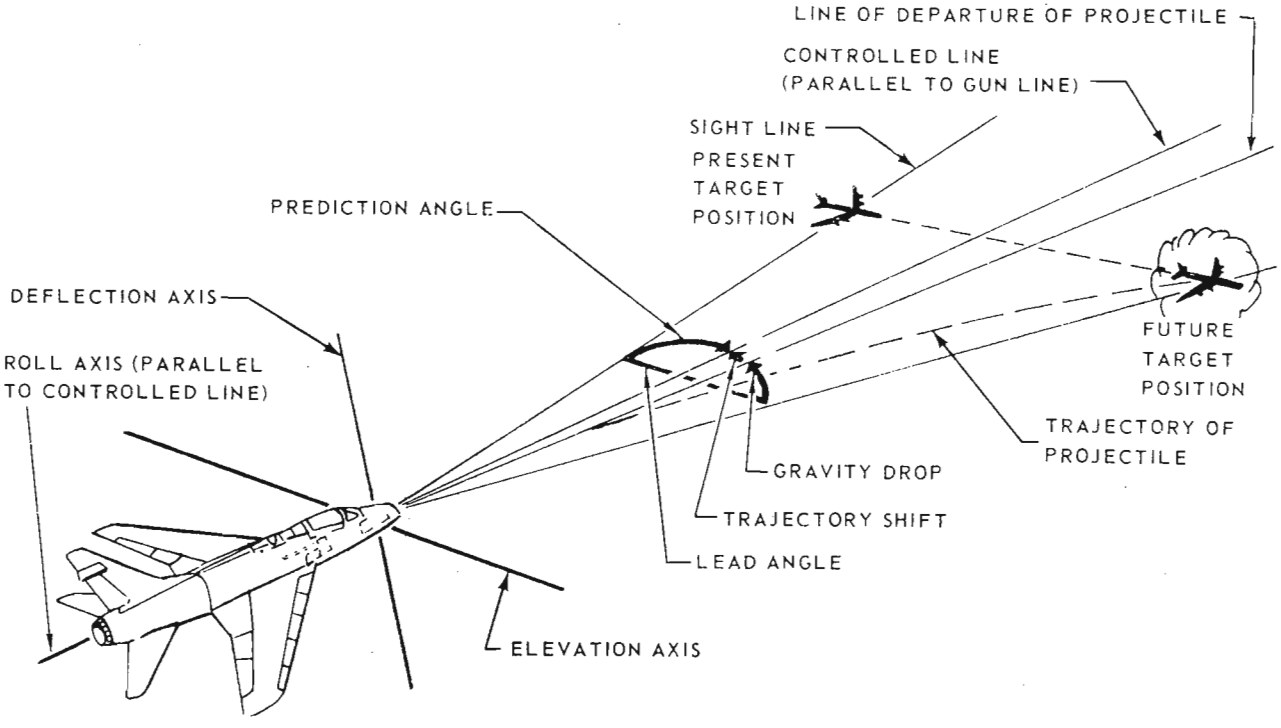


Figure 1-1. Aerial Attack – 20 MM Guns

minimize exposure to the bomber's defensive fire. Various pursuit curve formulas and derivations are presented in section IV.

AIM-9B/E/J Missile Delivery. The AIM-9B/E/J is the only air-to-air missile presently compatible with the F-100 airplane. The AIM-9 is delivered from a pursuit curve attack, using a 70-mil fixed sight. (See figure 1-2.) Against a non-maneuvering bomber, an AIM-9 attack is potentially much more effective than a 20 mm gun attack. The longer range of the AIM-9 allows the pilot to remain outside effective gun range of the defending bomber. Also, very little training is required in learning to effectively employ the AIM-9. Against a maneuvering target, the potential of the AIM-9 is not nearly so great, because a proficient pilot who is aware of an impending launch can easily maneuver to nullify a missile attack. To accomplish a successful AIM-9 attack, the pilot must maneuver into the firing envelope, track momentarily, detect the proper tone in his headset, and squeeze the trigger. (On some airplanes, the trigger must be held depressed until the missile leaves the launcher.) Since the AIM-9 is a passive infrared (IR) homing missile, the pilot is free to maneuver as soon as the missile leaves the launcher. The size and shape of the launch envelope are determined by the IR pattern and missile limitations. Factors affecting missile limitations are G, look angle, and range parameters. Refer to the Classified Supplement, T.O. 1F-100D(I)-34-1-1B, for detailed information on firing envelopes.

Ground Attack – Guns. A gun attack (figure 1-3) against surface targets, commonly known as strafing, is the most versatile and accurate method of delivering ordnance. It is, therefore, highly effective against a wide variety of targets vulnerable to 20 mm ammunition.

The strafing attack is easily performed and may be initiated with a minimum of preplanning. The attack may be initiated from an angle-off or straight-ahead approach, and the dive angle may be varied to fit the particular target situation. The lower dive angles (5 to 15 degrees) are generally more effective because of ease in tracking and an increase in the amount of ordnance that may be effectively placed on the target during a single-firing pass. The main concern during this delivery is firing at the proper slant ranges where projectile impact is in proximity to the pipper position. If firing is to be accomplished beyond these ranges, the sight is depressed so that tracking index position and projectile impact are coincidental. Another method of correcting for this condition is to hold the tracking index above the target the proper amount so that projectile impact is on the target. Tables for the 20 mm guns are presented in T.O. 1F-100C(I)-34-1-2 to provide the correction necessary under various delivery conditions. Although the effect is small, both rangewind and crosswind do affect the strafing attack and must be compensated for, especially on pinpoint targets. Tables for the 7.62 mm guns will be supplied when available.

Ground Attack – Bomb Delivery. Bombing is divided into categories of level and dive delivery. Dive bombing is further divided into categories of high-angle, medium-angle, and low-angle delivery. Figure 1-4 graphically shows a dive delivery. The bombing tables in T.O. 1F-100C(I)-34-1-2 provide trajectory data for level delivery for most bombs and dive delivery up to 15, 30, 45, 50, or 60 degrees, depending on the type of munition.

Consistency in the all-important roll-in parameter cannot be overemphasized. The parameters of altitude, airspeed, distance from target, and power setting must be designed to place the airplane at a predetermined release altitude and distance from target, with a predetermined bomb release velocity to effect an accurate impact. Because of the longer periods of wind effect on the trajectory of the bomb, it is also important that the pilot have knowledge of the magnitude of wind effect and, primarily, the wind velocity at release altitude.

The A-4 sight is used, in conjunction with the altimeter, to determine the release point. The bombing tables provide the sight depression angle relative to the flight path for various rangewinds. To obtain the actual sight setting, algebraically add the caged sight line angle of attack to this figure. Several factors must be considered when determining an indicated release altitude: altitude loss during pullout, minimum airplane ground clearance, altimeter lag, and target elevation. The altimeter is set according to target pressure reduced to sea level (current altimeter setting). Immediately following bomb release, a 4G pullout is initiated. The acceleration rate is 4G attained in 2 seconds after release.

Ground Attack – "Bunt Bombing". A method of dive bombing by which to simplify the tracking problem is to place the tracking index on the target at roll-in for the maneuver, and track this point until release. The flight path described in this maneuver can be defined as a convergent dive. The target lead angle is zero in this maneuver and consequently the lead angle rate of change is zero. This technique offers the advantage of allowing the pilot more time to attain the proper dive angle, release speed, and release altitude (or slant range) since his tracking problem has been partially solved. Tracking the target also forces the aircraft toward the proper space position and thus compensates for small judgment errors at roll-in. This technique is called "bunt bombing".

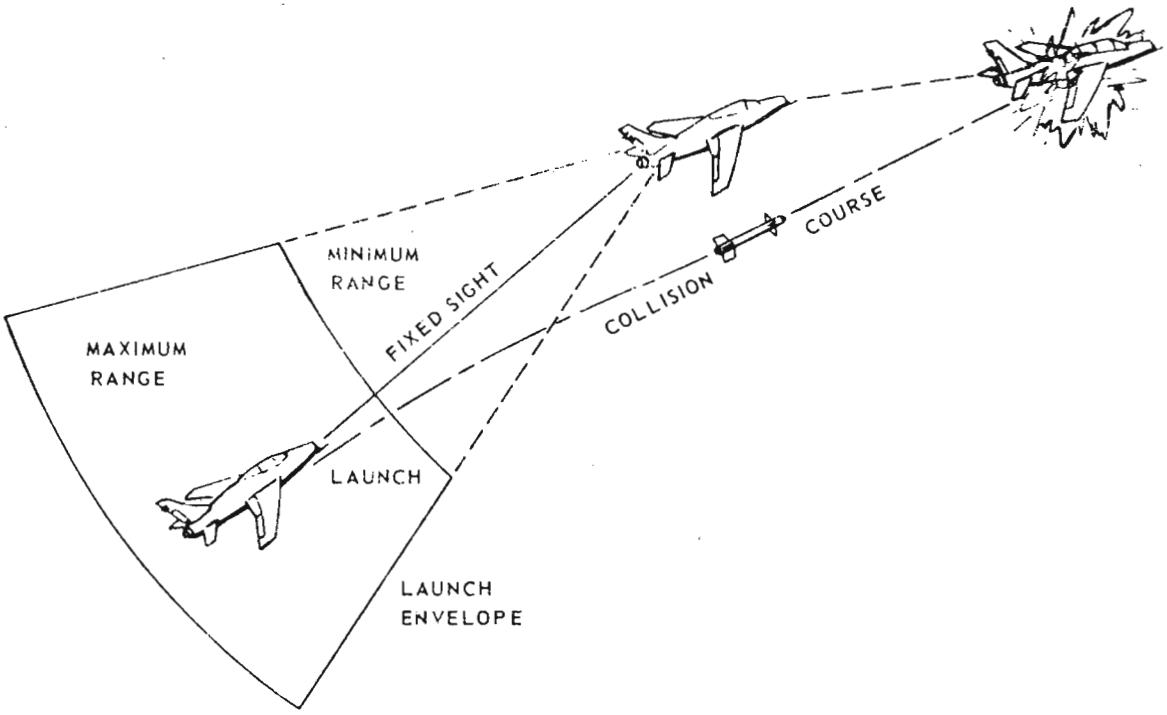


Figure 1-2. Aerial Attack – Aim-9B/E/J Missile

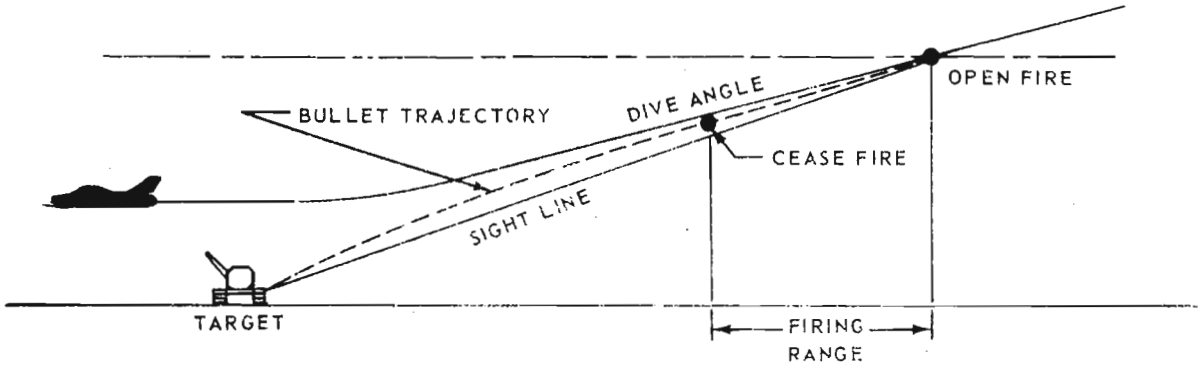


Figure 1-3. Ground Attack – 20 MM Guns

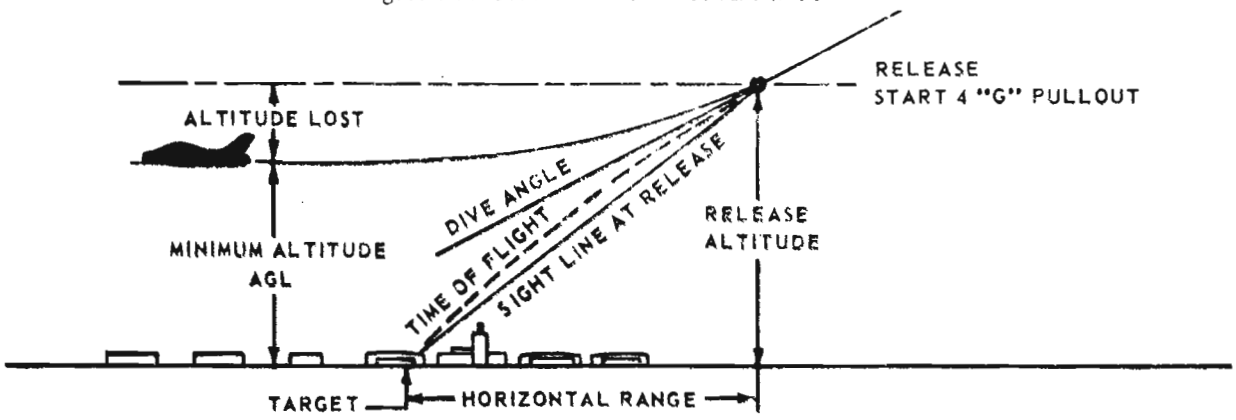


Figure 1-4. Ground Attack – Bomb Delivery

To understand the limitation of this bombing technique we must first examine what forces are acting on the aircraft at bomb release. The predominant force that determines if adequate bomb/aircraft separation can be obtained, is aerodynamic force. Ejection force and aircraft G-load are the only other forces that affect bomb/aircraft separation. The pilot has no control over the aerodynamic or ejection forces but he has complete control over aircraft G-load. Obtaining the proper G-load at bomb release will insure adequate bomb/aircraft separation and make the planned sight angle valid. The G-load on the aircraft arises from a combination of the component of gravity acting normal (perpendicular) to the flight path and the maneuvering force.

In level flight the maneuvering, force is zero, and the gravity component normal to the flight path is equal to one G, thus, a pilot exerts a downward force on the seat equal to his weight. Likewise, in level flight, bombs suspended from the rack exert a force equal to their own weight. When a straight flight path is flown as in a normal dive delivery, the G-load on the aircraft is simply a cosine curve since, by definition, the aircraft is flying a straight-line flight path, and the maneuvering force is zero. Thus, the gravity component acting normal to the flight path is the cosine component with reference to the dive angle. This gravity component can be expressed as aircraft G-load and is equal to the cosin of the dive angle. (G-load = cos Θ where Θ = dive angle in degrees.) When a convergent dive is flown as in a bunt delivery the G-load on the aircraft is still a combination of the gravity component and maneuvering force. Tracking the target requires a maneuvering force and consequently the G-load on the aircraft in a convergent dive will be less than in a straight flight path dive. The G-load on the aircraft can be expressed as follows: G-load = cos Θ - MF, where Θ = dive angle in degrees, MF = maneuvering force. The maneuvering force can be computed using an equation derived from Newton's law as applied to rotating systems.

$$\text{Maneuvering force} = MF = \frac{SV^2}{32{,}200r}$$

where S = sight angle (depression from flight path), mils

V = Aircraft Velocity, ft/sec

r = Slant Range, ft.

Figure 1-5 is a graphic representation of this equation.

NOTE

By use of the above method the exact aircraft G-load at release can be computed and a determination can be made as to whether the release limits as outlined in the aircraft flight manual will be exceeded. It is important to insure that these limits are not exceeded or an aircraft/bomb collision could occur. The fact that release limits can be exceeded using the bunt bombing technique precludes the use of this technique under certain release conditions.

How to Compute Sight Settings for the "Bunt Bombing" Technique. To compute a depressed sight setting only three things are needed: bomb ballistic angle or depression from flight path; aircraft angle of attack; and the harmonization constant or angular relationship between the fuselage reference line and the caged sight line or radar bore sight line. The bunt bombing technique changes only one of these requirements from the normal bombing technique. The aircraft angle of attack will be different because the aircraft G-load at release will be different. By looking at an F-100 angle of attack chart (Figure 1-6) we see that "G" can be expressed as dive angle, as is the case with normal F-100 ECSL angle of attack charts. To obtain bunt bombing sight settings the dive angle lines are interpreted as G lines, or Figure 1-6 may be used.

Sample Problem.

F-100D/MK-82 GP Bomb
30 degree-dive 450 knots IAS
3000 feet AGL Release
3000 feet Target Altitude + 14 Degrees C Target Temp
32,000 lbs Gross Weight

1. Determine TAS (Should be 510 KTS).

2. Enter dash 34 with planned dive angle (30 degrees), true airspeed (510) knots, and release altitude (3000 feet) to obtain slant range to target (5045 feet), depression from flight path (117 mils), and wind correction (9.5 feet/kt).

3. Enter maneuvering force chart Figure 1-5 with DFP (117 mils) and slant range of 5045 feet). Plot intersection of this line with reference line. Draw line from true airspeed (510K) through this point and read maneuvering force of .535G.

4. Subtract maneuvering force "G" (.535) from G for a 30 degree-dive (.866) to obtain aircraft "G" at release or .331 "G". (Check release limits with this "G".)

5. Enter angle of attack chart with indicated airspeed (450K), gross weight (32,000) pounds, and "G" load of .331. Determine aircraft angle of attack (Should be +14 mils).

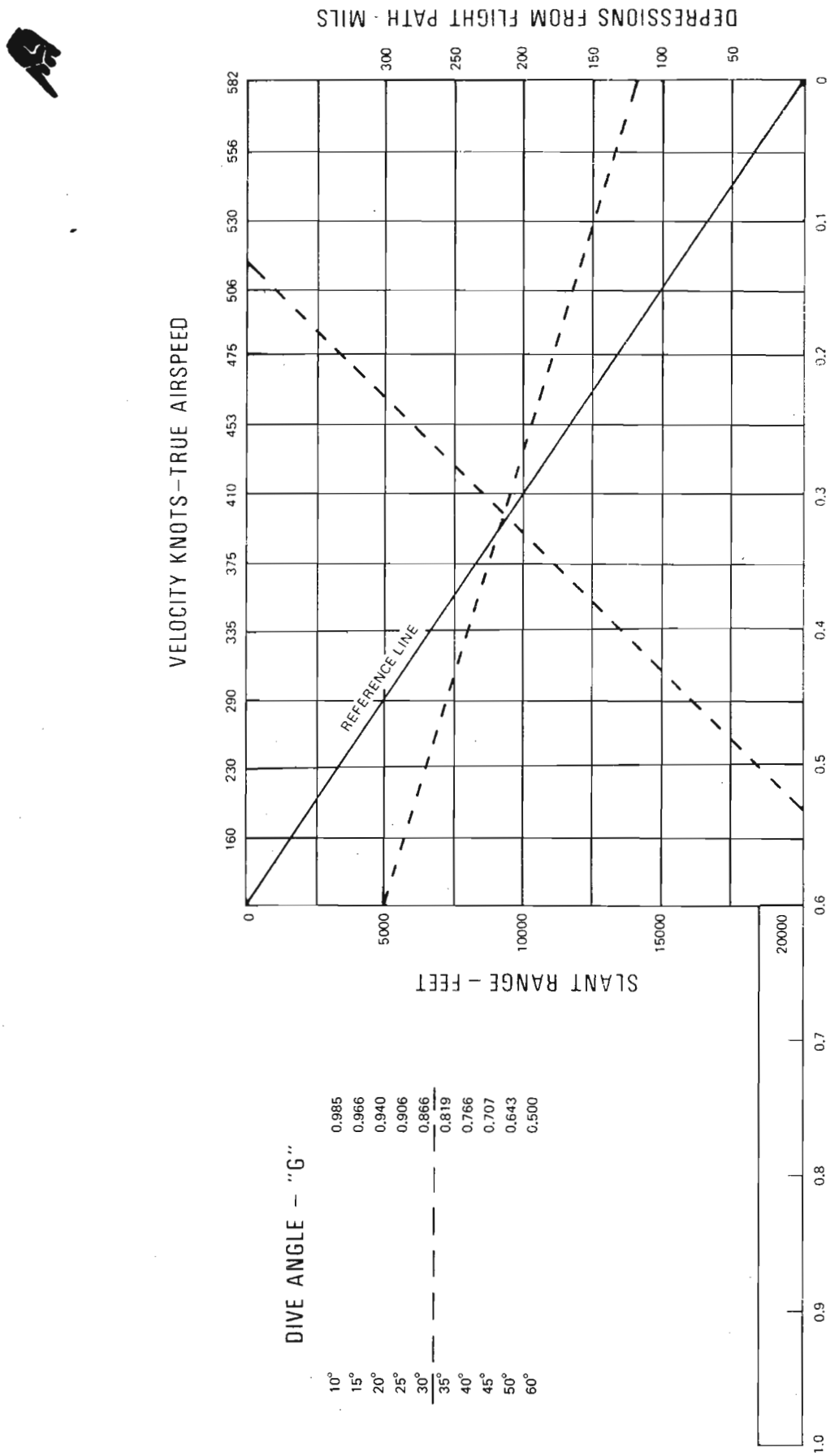


Figure 1-5. Maneuvering Force Chart

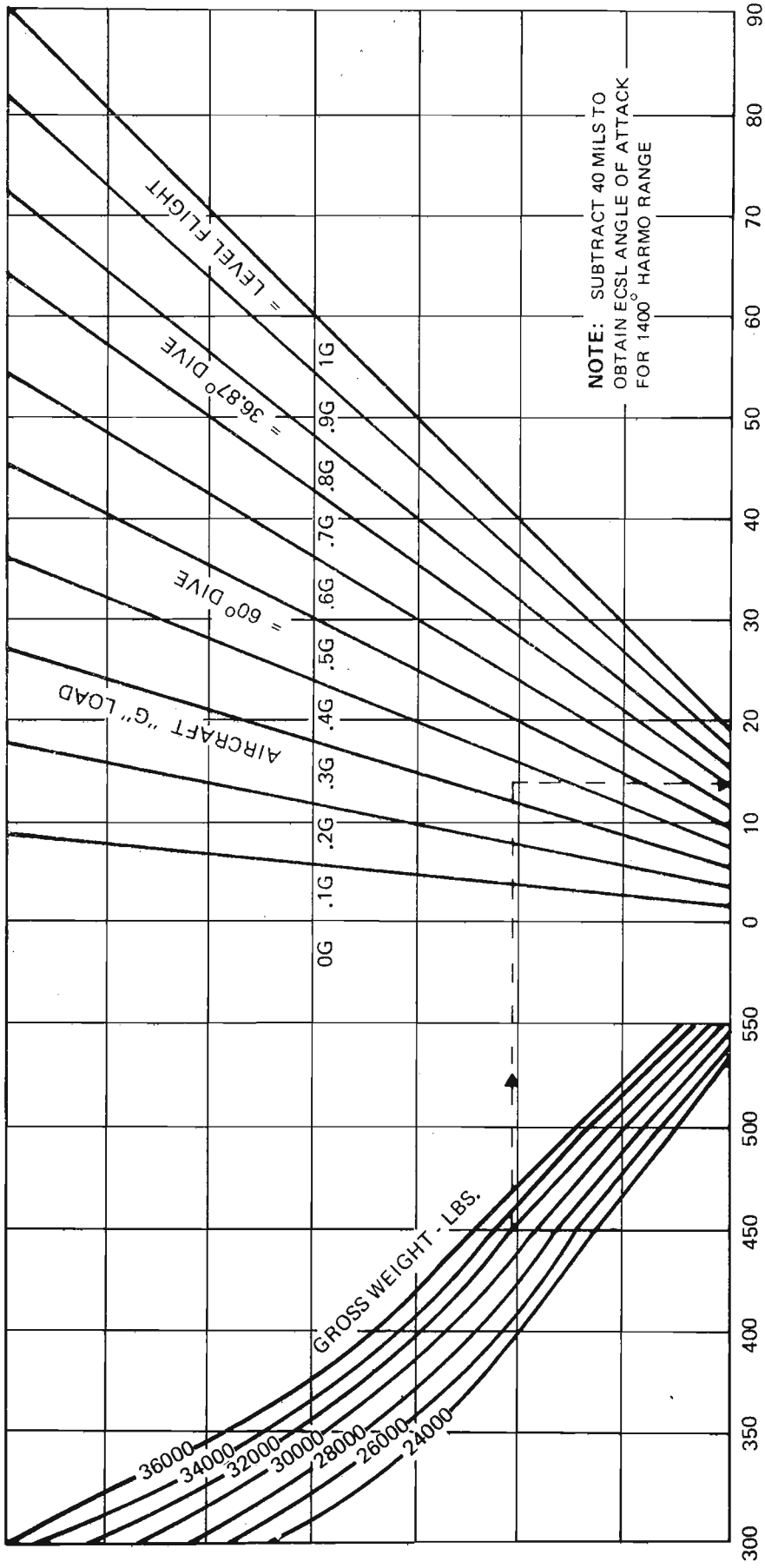

INDICATED AIRSPEED - KNOTS
MILS
NOTE: SUBTRACT 40 MILS TO OBTAIN ECSL ANGLE OF ATTACK FOR 1400° HARMO RANGE
= LEVEL FLIGHT
= 36.87° DIVE
= 60° DIVE
AIRCRAFT "G" LOAD
0G .1G .2G .3G .4G .5G .6G .7G .8G .9G 1G
GROSS WEIGHT - LBS.
36000
34000
32000
30000
28000
26000
24000
300 350 400 450 500 550 0 10 20 30 40 50 60 70 80 90

Figure 1-6. F-100D/F Angle of Attack Chart

6. Subtract HARMO constant of 40 mils from aircraft angle of attack (14 mils) to find caged sight line angle of attack (-26 mils).

7. Apply cage sight line angle of attack to depression from flight path [117 + (-26)] to find sight setting of 91 mils.

PILOT TECHNIQUES. The approach altitude and airspeed to the roll-in for a bunt dive delivery is the same as would be flown during a normal straight flight path delivery. The roll-in should be planned to arrive at roll-out in a wings-level condition with the tracking index on or near the target. The initial dive angle at roll-out should be slightly less than the planned release dive angle, (1 to 2 degrees loss). The initial concern after roll-out should be tracking the target, which will require forward stick pressure and trim. Once tracking has been established, check dive angle and airspeed and mentally calculate a new release altitude if these parameters are off. Rule-of-thumb for error compensation: 5 degrees steep or 20K fast, release 500 feet high, 5 degrees shallow or 20K slow, release 500 feet low. During the remaining portion of the dive, concentrate on tracking and releasing at the exact altitude that you have calculated.

A pilot proficient in bunt bombing can compensate for dive angle and airspeed errors by releasing at the proper "G" load. Since the maneuvering force is independent of dive angle and dependent on slant range, releasing on "G" load will tend to maintain a constant slant range, and will thus minimize errors.

WIND CORRECTIONS. In bunt bombing the upwind aimpoint is computed in exactly the same manner as for the normal bombing technique. For crosswind corrections, roll in with the tracking index upwind of the target and on a 3/9-o'clock line through the target. Track this line, allowing the tracking index to drift toward the aimpoint. The tracking index should arrive on the aimpoint at the proper "G" and release altitude. For headwind or tailwind corrections, roll in to place the tracking index upwind of the aimpoint. Track on a line to your aimpoint so as to arrive at the proper "G" and release altitude with the tracking index on the upwind aimpoint. A rule-of-thumb for initial tracking index placement on roll-in for wind corrections is 2-3 times the required offset, upwind of the target.

Ground Attack – Stick Bombing. Multiple bomb release (figure 1-7) may be accomplished using the ripple release mode for either level or dive attack conditions. The desired impact spacing will depend on the type of target to be attacked. The drop interval control is used to set the time interval between bombs which will provide the desired impact spacing for the planned release condition.

The impact pattern stick length tables, tables 1-10 and 1-11 of T.O. 1F-100C(I)-34-1-2, provide impact stick length data for high-drag and low-drag bombs for various dive angles, release airspeeds, initial release altitudes, and drop interval control settings. The average spacing between bombs may be computed by dividing the impact stick length by the number of bombs minus one.

WARNING

For a stick of bombs released from a dive maneuver, the release altitude of the last bomb in the stick must be greater than the minimum release altitude required for safe escape from bomb fragments, sufficiently high to provide adequate ground clearance during recovery, and sufficiently high to provide adequate time for fuze arming for the bomb/fuze combination being employed.

Ground Attack – Fire Bomb Delivery. Release of fire bombs may be accomplished by two modes of delivery, depending upon target characteristics and terrain features. These deliveries are level and low-angle bombing.

Level bombing (figure 1-8) consists of a low altitude level approach to the aimpoint, maintaining a predetermined release airspeed and altitude. Low-angle bombing (figure 1-9) consists of a shallow dive angle approach to the aimpoint, maintaining a predetermined release airspeed and dive angle.

R_1	Range of First Bomb.
R_N	Range of Last Bomb.
θ	Dive Angle.
A_1	Release Altitude of First Bomb.
A_L	Altitude Lost During Pullout.
A_N	Release Altitude of Last Bomb.
N	Number of Bombs Released.
R_P	Range from Release to center of pattern.
SD	Sight Depression.
t_1	Time of fall of first bomb.
I_R	Release Interval in Sec.
PL	Pattern Length.

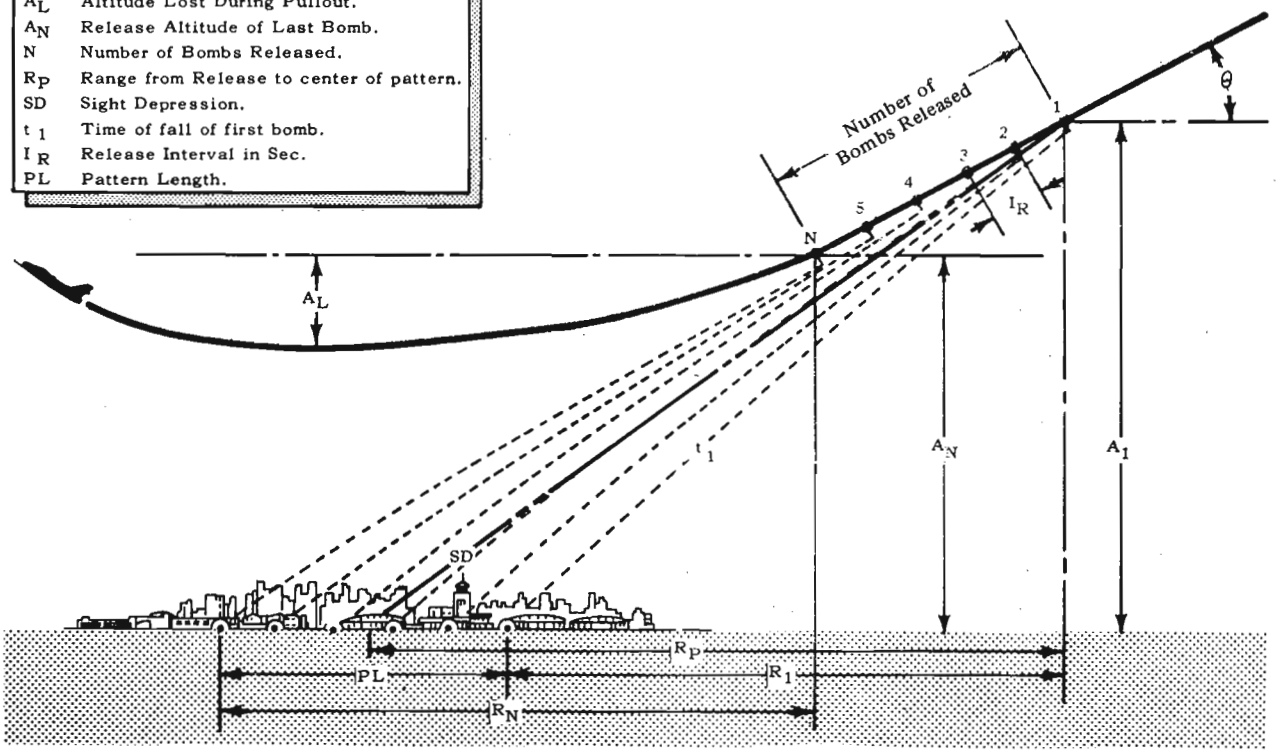


Figure 1-7. Ground Attack – Stick Bombing (Dive Delivery)

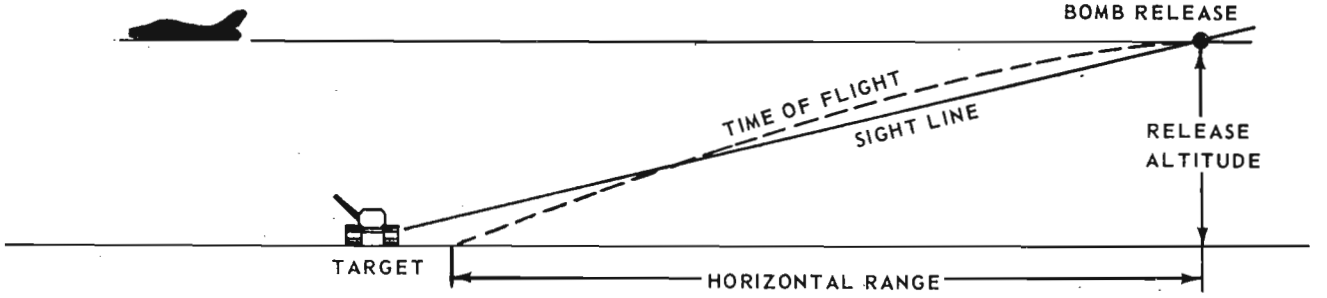


Figure 1-8. Ground Attack – Fire Bomb Delivery (Level Delivery)

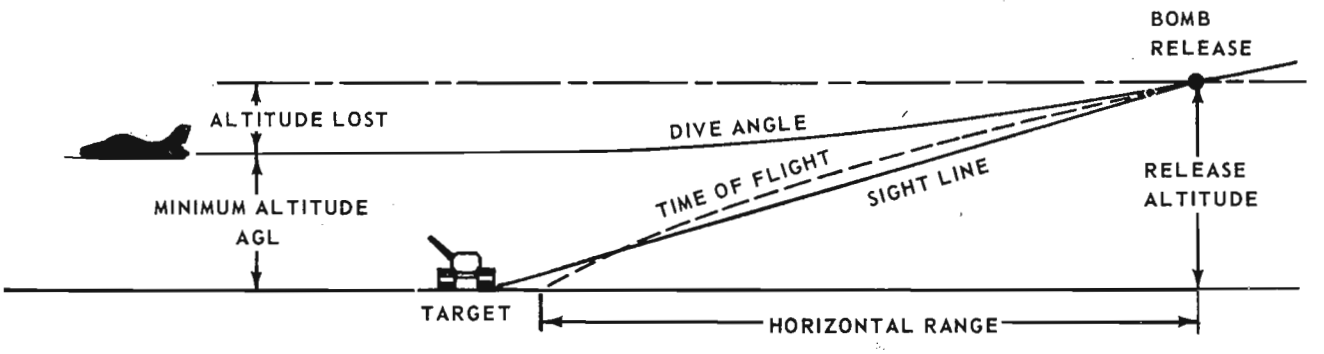


Figure 1-9. Ground Attack – Fire Bomb Delivery (Low Angle Delivery)

During the level delivery, release speed and height above the target are established during the level-flight approach to the target. The optical sight depression used to determine the release point is based on the distance from release to impact, corrected for rangewind. Crosswind correction for low-drag weapons is accomplished by crabbing into the wind so that the flightpath is directly over the target. An additional offset aimpoint correction is required for the delivery of high-drag weapons (MK-106, CBU, or Snakeye-type ordnance) because of the increased time-of-flight and high wind-acceptance values. Crabbing to eliminate crosswind may cause the sighting reference to be offset from the target at release.

The considerations in delivering fire bombs during a low-angle bomb attack are essentially the same as in dive bombing. The airplane must be flown to position it at a predetermined reference. Correction for crosswind during this delivery requires an offset aimpoint because of airplane drift at release affecting bomb line of flight. Ballistics tables for fire bombs and practice bombs, utilizing both level and low-angle deliveries, provide sight depression data that will place the point of impact on target. Special charts are provided in T.O. 1F-100C(I)-34-1-2 for the recomputation of sight depression angles for other desired impact points.

Practice bomb ballistics tables are provided for the BDU-33/B, BDU-33A/B, and MK-106, covering the same delivery parameters listed for fire bombs. When utilizing the MK-106 in a level delivery, an offset aimpoint, in addition to crabbing into the wind, must be utilized because of its high drag and wind acceptance characteristics.

Ground Attack – CBU Weapon Delivery. The CBU series weapons may be delivered by basically the same delivery method described under 'Bomb Delivery' and 'Fire Bomb Delivery'. Certain differences will be noted in comparing figures 1-10 and 1-11. In either method of CBU delivery, the sight depressed sight line is used to determine the proper release point and to correct for rangewind. The ballistics tables contained in T.O. 1F-100C(I)-34-1-2 are designed to place the initial weapon impact on target, unless otherwise noted, when the ordnance is released as the tracking index reaches the target. Special charts are provided for the recomputation of sight depression angles for other desired impact points.

Crosswind correction is applied by maintaining a ground track parallel to, and upwind of, the desired no-wind ground track. The amount of crosswind correction required varies with weapon time-of-fall and the particular CBU weapon to be employed. Crosswind correction figures are given in the appropriate bombing tables. Because of the limited quantity of explosive contained in each bomblet of a CBU weapon, it is necessary that the bomblets impact in the immediate proximity of the desired target. Pattern density and length relieve, to a considerable extent, the range errors inherent in low-level bombing. However, it is critically important that the delivery pilot pay particular attention to the elimination of deflection (3 and 9 o'clock) errors.

Ground Attack – Rocket Delivery. Rocket delivery (figure 1-12) and dive bombing considerations are essentially the same with respect to roll-in position, wind correction, release point, and pullout maneuver.

The LAU-3, -32, -59, and -68 series rocket launchers fire the 2.75-inch folding-fin aircraft rocket (FFAR) at a fixed interval until the entire package is fired, an approximate period of 0.10 and 0.07 second, respectively. This provides excellent dispersion when firing at high speeds. The revised format of the rocket launch tables eliminates lengthy computation of the optical sight depression angle by providing the actual sight setting for various electrical caged sight line (ECSL) angle-of-attack values at launch. All that remains to be accomplished is to determine the necessary rangewind and crosswind correction values.

Leaflet Bomb Delivery. The M129E1 leaflet bomb is released from level flight at release altitudes of 5,000 through 10,000 feet. The bombing table states the bomb time of flight and range from release to burst for a given level flight release true airspeed and release altitude above target. The time of flight is used to set the mechanical time-delay fuze for a 3,000-foot detonation. The bomb range is used to estimate the release point.

Wind effect on the bomb before burst will be a function of wind velocity and bomb time of flight. The wind effect on the leaflets after bomb detonation and during the 3,000-foot descent is unpredictable.

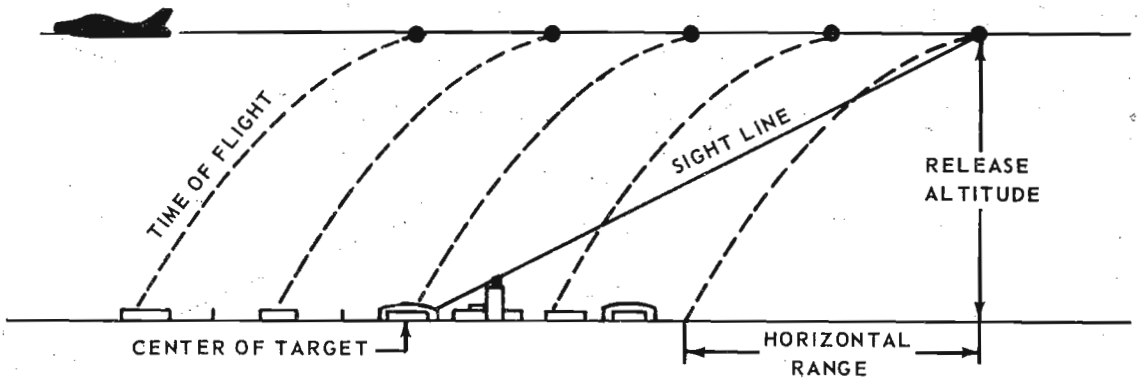


Figure 1-10. Ground Attack – CBU Weapon Delivery
(Level Bombing)

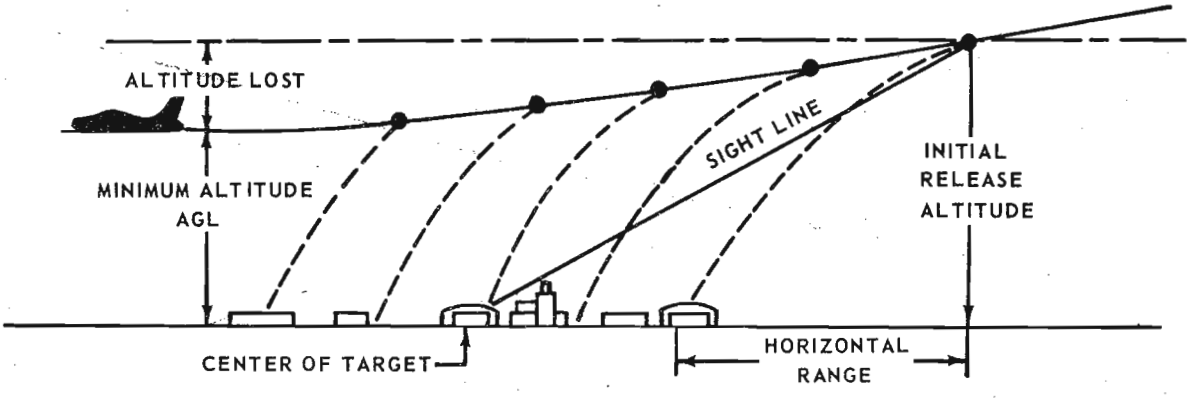


Figure 1-11. Ground Attack – CBU Weapon Delivery
(Low Angle Delivery)

Flare Dispensing. The delivery airplane approaches the target in level flight at the preplanned release altitude (figure 1-13) and dispenses the first flare approximately 5,000 feet short of the target. Normally, a second flare is dispensed 3 seconds later to illuminate the target and the run-in-line. The delivery airspeed and release altitude are not critical parameters. The dispensing airspeed may be between 300 and 450 knots CAS. Dispensing the flare from 4,600 feet above ground level (AGL) allows 15 seconds of freefall, 10 seconds of ignition delay, and 2.5 minutes of flare burning time (plus an additional 1,000 feet burning time) to insure flare burnout at 1,000 feet AGL.

The ballistics of the flare, before parachute deployment, are similar to the MK-106 practice bomb. Rangewind correction and crosswind correction should be applied, using a wind factor of 150 feet per knot of wind. The flare should not be dispensed directly on the run-in course of the intrail airplane.

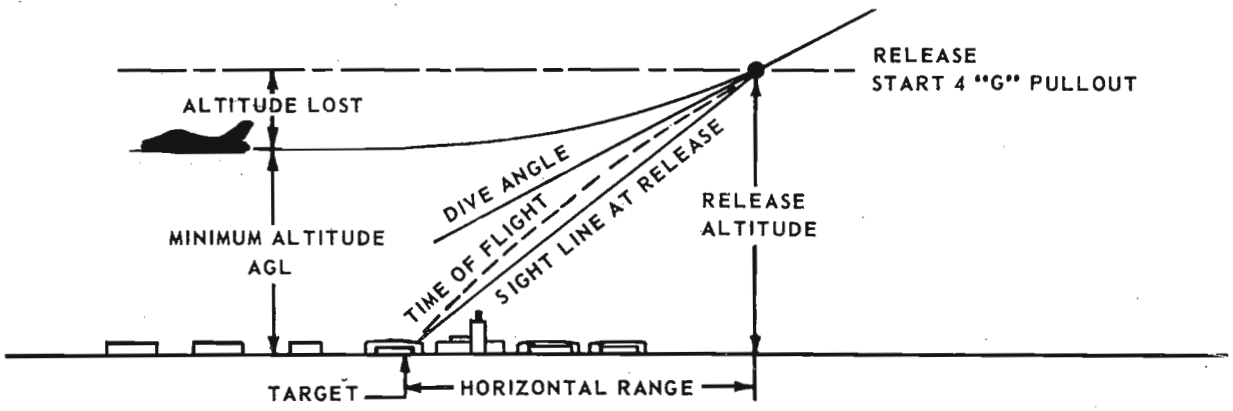


Figure 1-12. Ground Attack – Rocket Delivery

WEAPON SYSTEMS AND CONTROLS– AIRPLANES NOT CHANGED BY T.O. 1F-100D-632.

AN/ASG-17 Fire Control System. The AN/ASG-17 fire control system automatically computes and solves the fire control problems involved in aerial attack, and ground attack rocket firing and bombing. A visual indication of this solution is reflected and positioned on a sight reflector glass in the form of a reticle image. This reticle image is in a circular pattern of light in the form of diamonds surrounding a center dot (tracking index).

Major components of the AN/ASG-17 fire control system are the sight, computer, sight amplifier, range servo, manual range control, sight dimmer rheostat, sight filament selector switch, variable rocket depression angle selector lever, range computer, transmitter-receiver unit, antenna, radar range sweep rheostat, radar-reject button, and power supply components for the system.

A-4 SIGHT. The A-4 sight (figure 1-14) is below the windshield. The sight contains the electrical, mechanical, and optical components that produce and position reticle image on the sight reflector glass. This provides a continuous visual indication of the prediction angle. The principal components of the sight are the mirror drive and mechanical caging assembly and the range assembly.

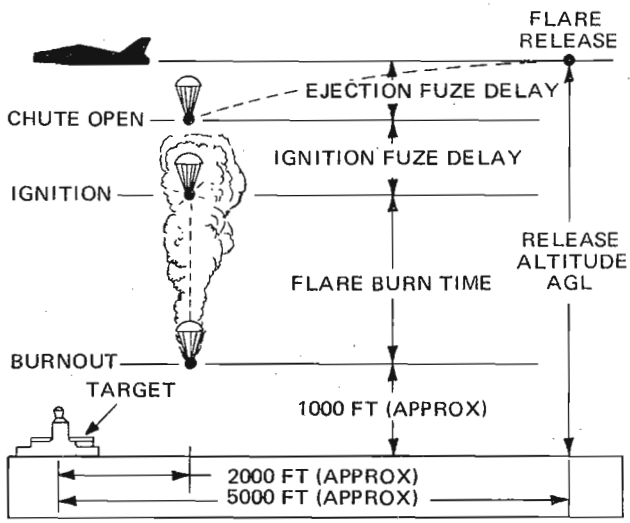


Figure 1-13. Flare Dispensing

To compute and present the correct sight picture for the pilot in an aerial attack is the primary task of the AN/ASG-17 fire control system. This is accomplished by automatically solving the prediction angle and projecting the reticle image in the proper position on the sight reflector glass. This angle is measured between the tracking line (a line from the gunner's eye through the tracking index and subsequently the target) and the mean fixed bore line (the average of the gun lines to infinity). This prediction angle establishes the required lead to impact on an aerial target is composed of lead for target motion (allows for movement of the target during projectile time of flight), gravity drop, and trajectory shift (allows for projectile change of direction from the mean fixed bore line toward the flightpath). Through the operation and calibration of the fire control system, the prediction angle may be solved if the system is provided with two inputs: present range to the target, supplied either by the radar subsystem or the manual ranging control; and target speed and direction, determined by the sight subsystem during the tracking process. At radar reject, the radar searches for a target and the sight subsystem is sent a voltage representing a constant range (choice of preset ranges: 2,400 ±150 or 3,000 ±150). When a target is within radar range, a lock-on signal proportionate to the distance is sent to the system, which automatically solves for the correct prediction angle and positions the reticle accordingly. As the pilot tracks the target through the pursuit curve, the fire control system is provided with target speed and direction. As the attack is continued, the system continually recomputes the prediction angle as information from the radar and tracking is modified. A maximum of one second of coordinated tracking is all that is required by the fire control system to provide an accurate prediction angle. If the radar is inoperative or if flight is at low altitude where ground effects cause erratic ranging, the manual ranging control can be used to determine target range for the system. This method requires the pilot to set the target wingspan into the sight with the wingspan lever and then constantly frame the target with the reticle image. This generates a proportionate signal, accurate only when the attacker is in the target's plan of symmetry, which enters the system in the same manner as does radar voltage.

In ground attack, the rocket function of the sight selector unit (figure 1-15) enables the pilot to select a prediction angle to compensate for weapon ballistics by depressing the tracking index through a range of 0 to 175 mils. When the rocket function is selected, the reticle is depressed the selected number of mils below the caged position and a constant range signal of 850 feet is sent to the system. The rigidity of the sight is increased by electrically caging the system for ground attack. This is also necessary because sight depression angle settings for ground attack are computed from the electrically caged sight line.

System limitations are as follows:

a. Warmup times: 5 to 15 minutes (varies inversely with temperature).

b. Altitude limits: sea level to 60,000 feet.

c. Fire control system capability, 800 to 6,000 feet; sight subsystem limits, 600 to 6,000 feet; radar subsystem limits, 800 to 9,000 feet; maximum break lock range, 1,000 feet; lock-on capability, 1,200 to 9,000 feet.

NOTE

When manual ranging is substituted for radar, the capability is reduced 1,200 to 2,700 feet (or the specific 1,500-foot span which manual ranging is preset to cover).

d. Aerial gunnery capability, 800 to 3,500 feet; fire control system capability, 800 to 6,000 feet; M-39 gun maximum effectiveness, zero to 3,500 feet.

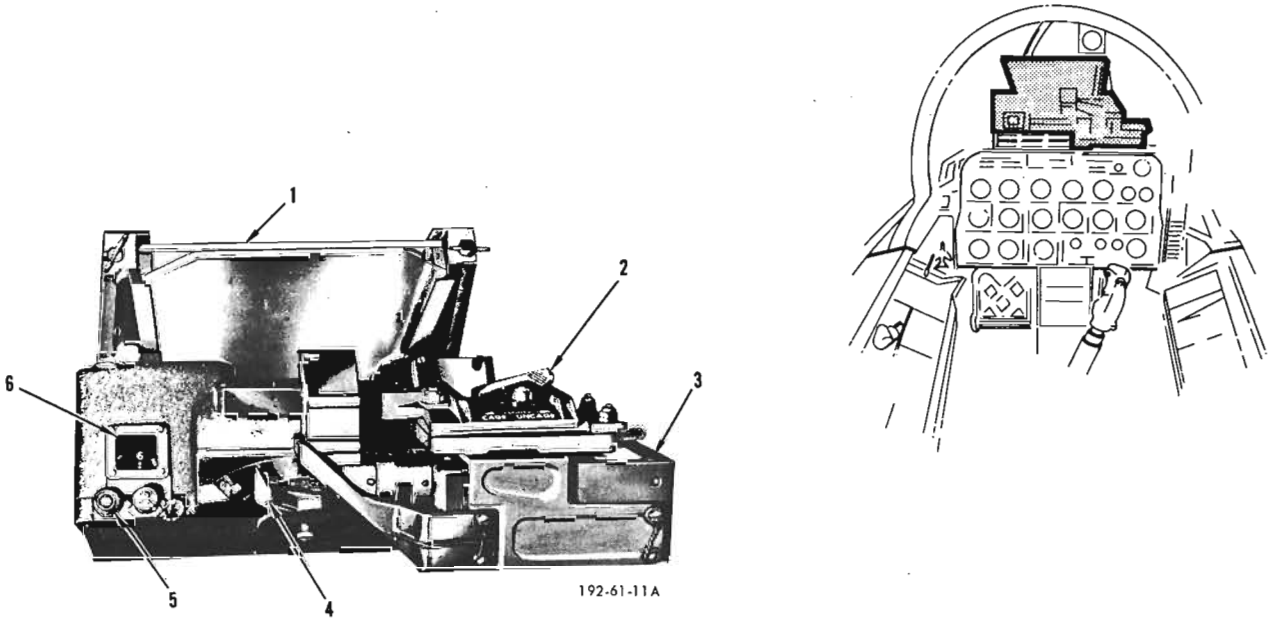
NOTE

The A-4 Sight Reticle will not be visible when the Armament Selector is in a bombs or napalm position and Mode Selector is manual unless the bomb arming switch is placed in one of the three arming positions.

A-4 Sight Controls and Indicators.

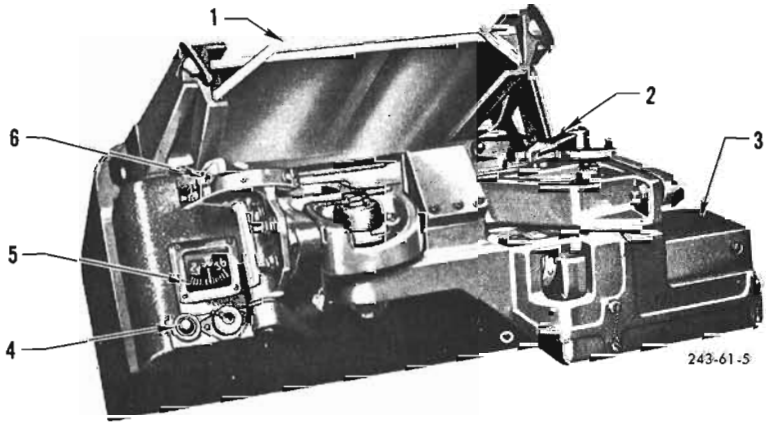
SIGHT DIMMER RHEOSTAT. The sight dimmer rheostat (figure 1-15) adjusts the brightness of the sight reticle. Turning the rheostat clockwise to BRIGHT increases reticle brightness. The sight reticle, on the sight reflector glass, is dim before lock-on (independent of the reticle dim control), and at lock-on the sight reticle increases in brilliancy. The sight dimmer rheostat requires secondary and tertiary bus power.

SIGHT FILAMENT SELECTOR SWITCH. Either the primary or secondary filament in the dual-filament sight reticle bulb can be selected by the sight filament selector switch. (See figure 1-15.) Normally, the brightest reticle should be selected regardless of the position of the sight filament selector switch. The switch requires secondary and tertiary bus power.



1. REFLECTOR GLASSES
2. SIGHT MECHANICAL CAGING LEVER
3. GUN CAMERA
4. WINGSPAN LEVER
5. RADAR LOCK-ON LIGHT
6. SIGHT RANGE DIAL

F-100C/D



1. REFLECTOR GLASSES
2. SIGHT MECHANICAL CAGING LEVER
3. GUN CAMERA
4. RADAR LOCK-ON LIGHT
5. SIGHT RANGE DIAL
6. WINGSPAN LEVER

F-100F (FRONT COCKPIT ONLY)

Figure 1-14. A-4 Sight.

ARMAMENT CONTROL PANELS

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632
AIRPLANES CHANGED BY T.O. 1F-100D-1069

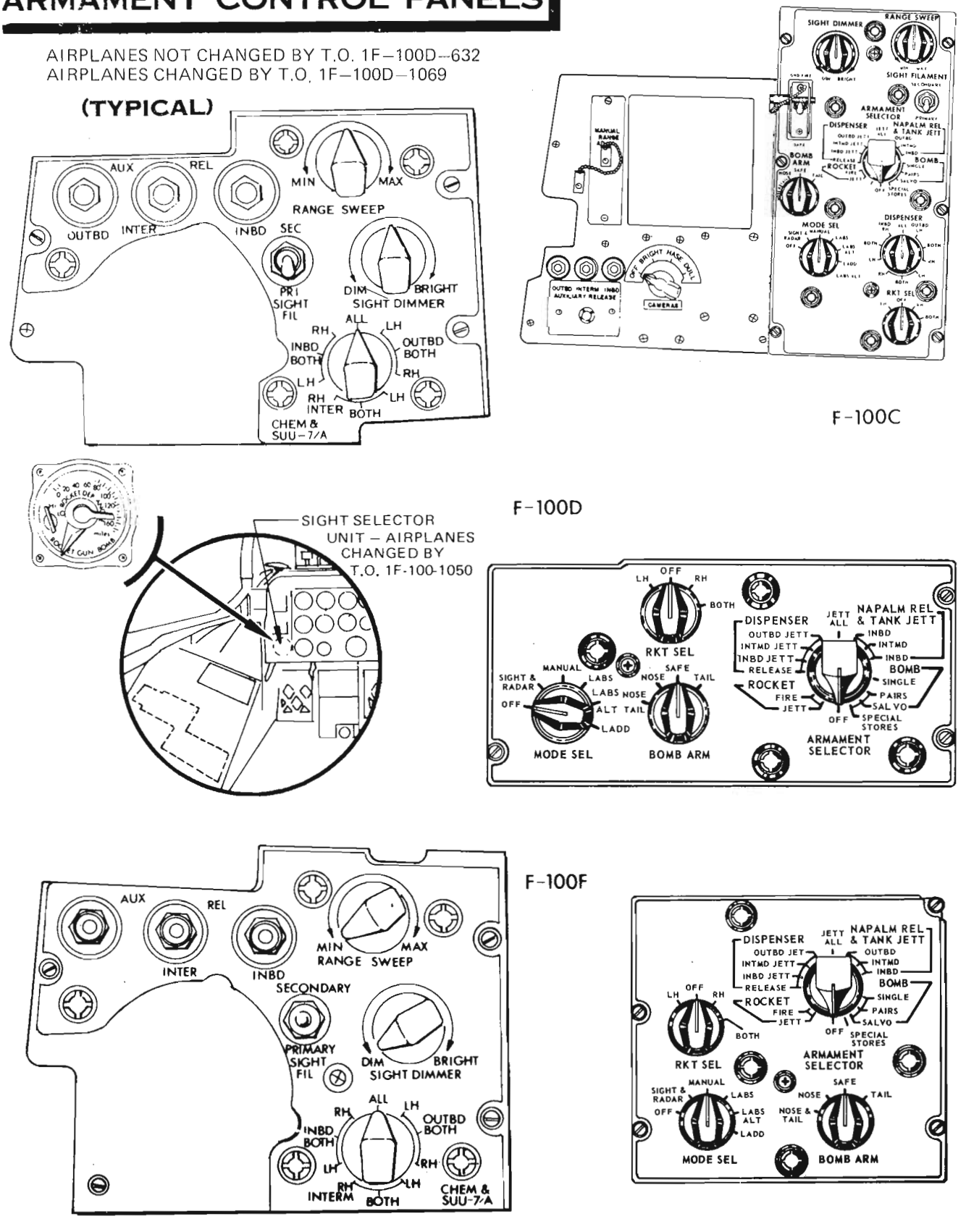


Figure 1-15. Armament Control Panel (Typical) (Sheet 1 of 2)

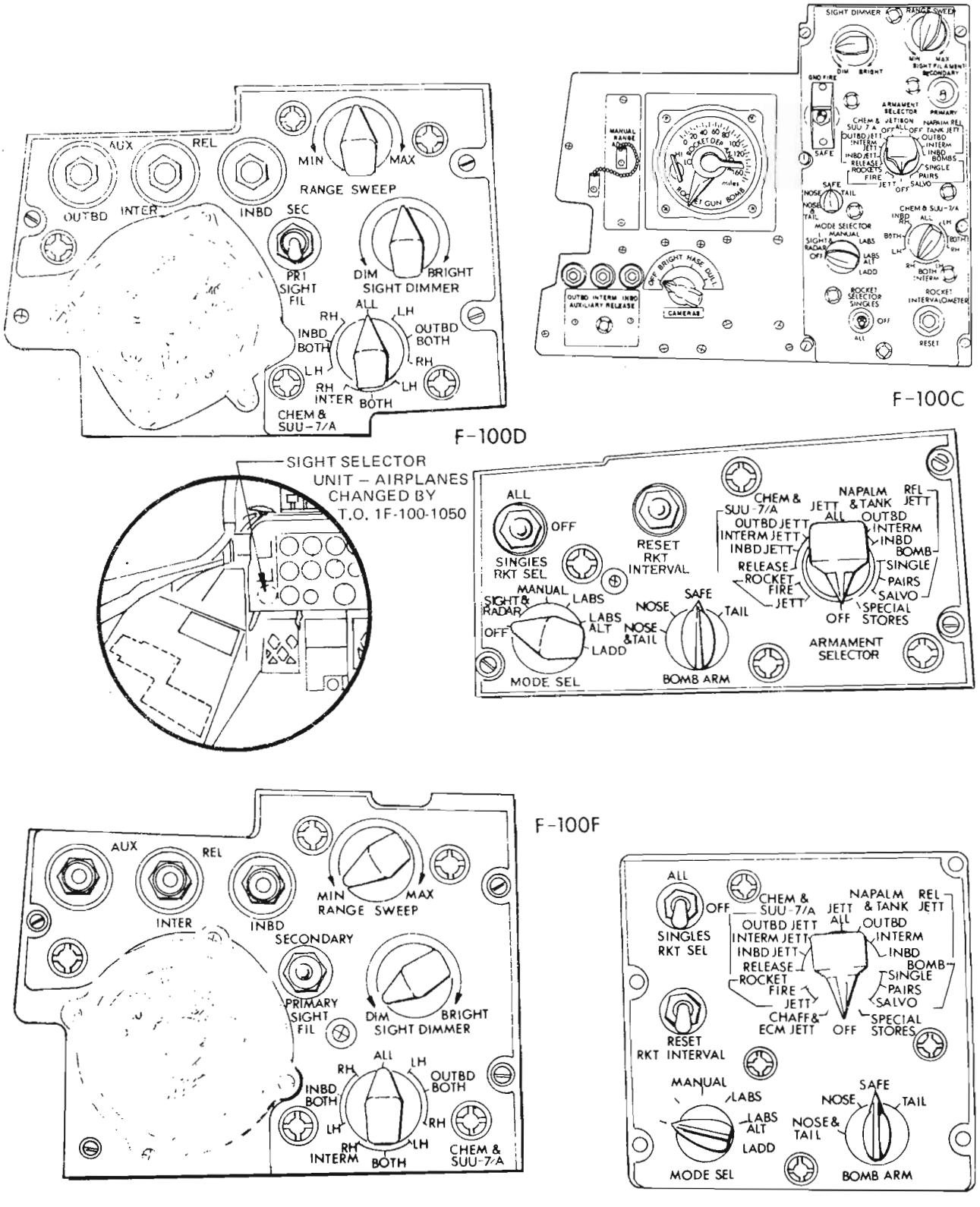


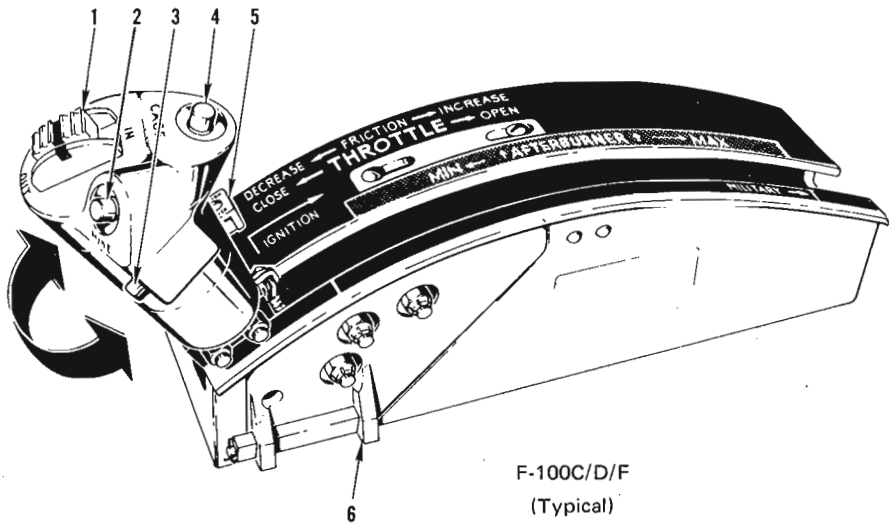
Figure 1-15. Armament Control Panels (Typical) (Sheet 2 of 2)

SIGHT SELECTOR UNIT. The sight selector unit (figure 1-15) has the sight function selector lever, the target speed switch, and the rocket depression angle selector lever. The sight selector unit uses secondary and tertiary bus power. The sight function selector lever, when set at GUN, BOMB, or ROCKET, adjusts the sight system for the desired function. The lever automatically returns to GUN from BOMB or ROCKET when the radar reject button, on the control stick grip, is pressed. The target speed switch (figure 1-15) is used to control a portion of the prediction angle computation in accordance with the speed ratio between the attacking airplane and its target. When a high-speed attack is being made on a slow-moving target, the switch should be at LO. The switch should be at HI when the speed of the target is approximately the same as that of the pursuing airplane, and TR is available as an intermediate selection. Speed ratios (TAS) for the various settings are as follows: for the LO setting, 600 knots for the attacking airplane and 200 knots for the target airplane; for the TR setting, 300 knots for the attacking airplane and 200 knots for the target airplane; for the HI setting, 600 knots for the attacking airplane and 500 knots for the target airplane. Movement of the variable rocket depression angle selector lever (figure 1-15) depresses the sight reticle image in increasing amounts through the full range of the mil scale (1 to 175 mils) according to the position selected. The index markers, numbered 1 through 4, are for reference only and have no function in the sight system. A tab, near the 50-mil mark on the circumference of the selector unit face, is pulled out to unlock the index markers for adjustment.

WINGSPAN LEVER. Setting the wingspan lever (figure 1-14) inserts target size data into the sight, allowing the sight reticle diameter to vary in proportion to range information signals received from the manual ranging control or the radar subsystem. Graduated markings (from 30 to 120) on the scale represent in feet the wingspan of the target airplane. With the sight mechanically caged, the reticle will not continue to expand if the wingspan lever is moved past 90 feet, as this position gives the maximum reticle size of 150 mils. (The minimum reticle size is 16 mils.)

MANUAL RANGING CONTROL. The twist control is the throttle grip (figure 1-16) permits range data to be supplied manually to the fire control system. Manual ranging is effective over a 1,500-foot segment of range and normally is set to cover the span between 1,200 and 2,700 feet. Ranges are shown on the sight range dial, and the sight reticle diameter varies in relation to the range information selected by throttle twist grip rotation. Clockwise rotation of the throttle grip selects a lesser range (increases reticle diameter); counterclockwise rotation selects a greater range (decreases reticle diameter). The throttle grip is spring-loaded to the full counterclockwise position. This is the correct position for normal (automatic) operation of the radar subsystem. Manual radar ranging requires secondary and tertiary bus power.

RADAR RANGE SWEEP RHEOSTAT. The rheostat (figure 1-15), powered by the secondary and teritary busses, is



F-100C/D/F
(Typical)

1. SPEED BRAKE SWITCH
2. MICROPHONE BUTTON
3. INTERPHONE CALL BUTTON (F-100F)
4. SIGHT ELECTRICAL CAGING BUTTON AND LABS VERTICAL GYRO CAGING BUTTON
5. FRICTION LEVER
6. IDLE AND OFF STOP

NOTE

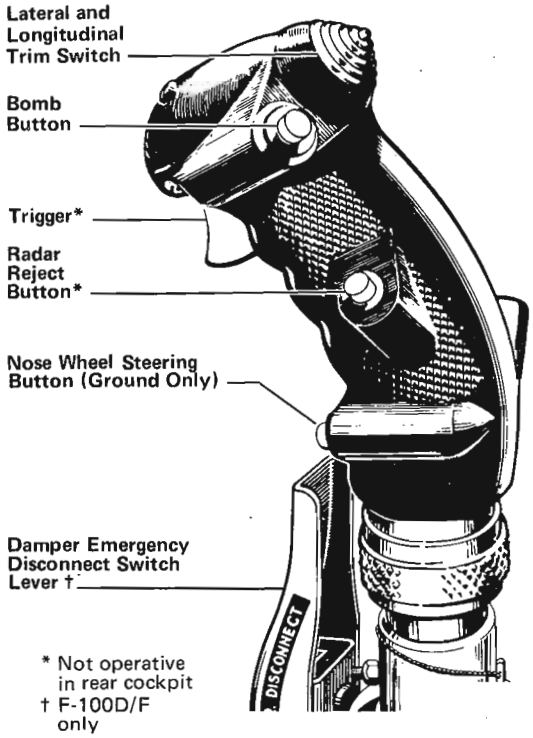
FRONT GRIP ONLY CAN BE ROTATED FOR SIGHT MANUAL RANGING (SPRING-LOADED TO FULL COUNTER-CLOCKWISE POSITION).

Figure 1-16. Throttle

used to decrease the maximum radar ranging distance and thus prevent the radar from locking onto undesired objects. Turning the rheostat toward MIN decreases the maximum radar sweep range to 3,000 feet; turning it to MAX increases the range to 9,000 feet.

RADAR REJECT BUTTON. The radar reject button on the stick grip (figure 1-17), powered by the tertiary bus, should be pressed momentarily to reject the range lock-on and return the radar to search. The radar can then lock onto targets at ranges greater than the one rejected until the radar maximum sweep range is reached. Radar sweep then automatically recycles, beginning to sweep again from minimum range. Pressing the radar reject button also automatically moves the sight function selection lever to GUN if the lever is at BOMB or ROCKET.

SIGHT ELECTRICAL CAGING BUTTON. Pressing the sight electrical caging button (figure 1-16) stabilizes the reticle by providing the fire control system with range information equivalent to 850 feet. The rigidity of the sight is increased, thus reducing reticle movement during hard maneuvering. Secondary and tertiary bus power is required for operation.



F-100C/D/F
(Typical)

Figure 1-17. Stick Grip

SIGHT MECHANICAL CAGING LEVER. The sight may be mechanically caged by operation of a caging lever (figure 1-14), which should be at UNCAGE for normal automatic operation of the sight. The lever should be moved to CAGE to provide a fixed reticle. The size of the fixed reticle depends upon the setting of the wingspan lever. (When the lever is at 60, a 100-mil diameter fixed reticle is produced when the sight is caged.)

SIGHT RANGE DIAL. Target range is indicated by the sight range dial (figure 1-14), which is graduated in feet from 600 to 6,000 and presents range distance as determined by the manual range control or the radar subsystem. Secondary and tertiary bus power is necessary for operation.

RADAR LOCK-ON LIGHT. The radar lock-on light (figure 1-14) comes on when the radar subsystem locks onto a target. The light is powered by the secondary and tertiary busses. The light housing may be rotated to control light intensity.

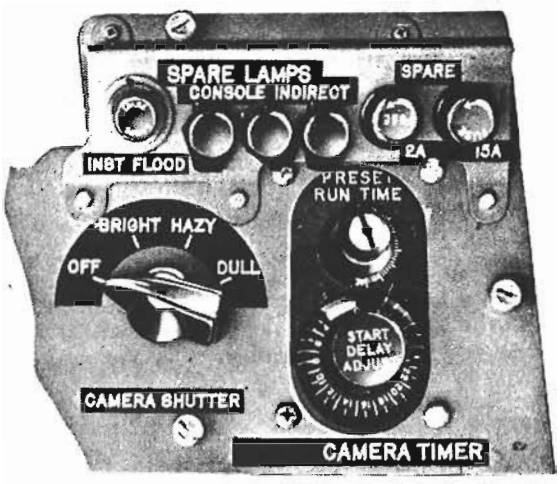
Camera System.

GUN CAMERA. The type N-9 or KB-3 gun camera (figure 1-14) is an electrically driven, magazine-type 16 mm motion-picture camera that simultaneously records the sight reticle and target during gun and missile firing. The camera can be adjusted by the pilot for various light conditions from the cockpit; however, frame speed, lens aperture, and camera overrun time (0 to 3 seconds) are preset on the ground by camera personnel. Thermostatically controlled camera and magazine heaters are provided. An automatic recycling counter on the camera body indicates the amount of unexposed film remaining in the magazine. Camera operation is automatic when the trigger or bomb button is pressed and the camera shutter selector switch is in any position other than OFF.

The gun camera can be operated by the trigger in three different modes: CAMERA, GUNS CAMERA, and MISSILES CAMERA. During gunnery operations, the camera operates only as long as the trigger is held depressed (plus preset overrun of 0 to 3 seconds). During missile firing, camera operation time after release of the trigger can be controlled by an adjustable timer.

Camera Controls.

CAMERA SHUTTER SELECTOR SWITCH. The shutter setting of the camera is adjusted through a tertiary-bus-powered switch. (See figures 1-15, and 1-18.) Turning



F-100D/F

Figure 1-18. Camera Shutter Selector Switch and Timer

the switch to OFF disconnects power to the camera, camera heaters, and shutter control. Turning the switch to BRIGHT, HAZY, or DULL, depending upon lighting conditions, positions the shutter aperture of the gun camera and turns on the camera heaters. For extremely low-temperature operation, the camera heaters should be on for a minimum warmup period of one-half hour.

CAMERA TIMER (F-100D/F ONLY). When the gun camera is used during missile firing, a camera timer (figure 1-18), with two pilot-adjustable time intervals, controls continued camera operation after the trigger is released. The first time interval, set before missile launch with the large timer knob labeled START DELAY ADJUST, represents camera running time in seconds from trigger release to start of the second time interval (4 to 30 seconds). The second time interval represents camera running time in seconds after completion of the first time interval, and must be set by the ground crew with the small timer knob labeled PRESET RUN TIME (2 to 30 seconds). Total camera run time after release of the trigger (6 to 63 seconds) is the total of both timer interval setting plus the present overrun time (0 to 3 seconds).

Operation of Gun Camera. The camera shutter selector switch must be at either BRIGHT, HAZY, or DULL to permit operation of the gun camera. To photograph the approach and tracking during gunnery operation, the trigger is pressed to the first detent. Gun camera operation continues when the trigger is pressed to the second detent to fire the guns or when the bomb button is depressed.

If only the camera is to be used, the trigger safety switch should be at CAMERA so that only the gun camera will be actuated by either detent of the trigger. If gun camera operation is desired during missile firing, the trigger safety switch should be at MISSILES CAMERA. The camera begins to operate when the trigger is pressed to the first detent, and continues to operate as the trigger is pressed to the second detent to fire the missile. Upon release of the trigger, the camera will stop, or, on F-100D/F aircraft, will continue to operate as determined by the setting of the camera timer.

COMBAT DOCUMENTATION CAMERAS – F-100D AIRPLANES CHANGED BY T.O. 1F-100D-627.

Forward and aft photographic documentation of weapon impacts is provided by two motion-picture cameras installed in a nonjettisonable pod (figure 1-19) on the underside of the left wing, approximately midway between the fuselage and inboard wing station. The forward camera is a Type N-9, identical to the Type N-9 that is mounted on the sight, except that the pod camera has a 20 to 80 mm variable focal length lens and a larger film magazine. The forward camera is mounted on a adjustable base that permits various elevation adjustments from zero (straight forward) to 20 degrees down. The aft camera is a Type DCM-4C that is an electrically driven, 16 mm internally loaded reel-type camera. It has a 17 to 68 mm variable focal-length lens. The aft camera mount is adjustable to permit variations in elevation from zero (straight aft) to 25 degrees down and from 45 to 60 degrees down. Camera operation is completely automatic and is initiated by pressing the trigger to the first and/or second detent, or pressing the bomb button. There are no other wing camera pod system cockpit controls. Adjustment for elevation, light conditions, frame speed, lens aperture, and camera overrun time are preset in the pod before flight.

In addition to the cameras, the pod contains a heater and a blower that supply a continuous flow of warm (26.6 degrees C to 40.5 degrees C) air across the camera windows to prevent condensation and frost. Sensors in the system help maintain temperatures within these limits and prevent overheating in case of a blower malfunction. A single window in the pod fairing for the forward-facing camera is equipped with electrically actuated shutters to protect the window from debris that might be thrown during takeoff. The window shutters open when camera operation commences and remain open. They can be closed manually during ground servicing of the pod. Two permanently exposed windows are provided in the pod aft fairing for the DBM-4C camera. The secondary bus provides power for the cameras when camera operation is started by the trigger. Tertiary bus power is used when the bomb button is pressed to start

camera operation. The camera heater and blower circuits, powered by the main 3-phase ac bus, are energized when power is applied to the airplane. Camera settings are as follows:

ORDNANCE	CAMERA	DEPRESSION (DEG)	FPS	LENS
Guns	Fwd	2-½	64	50 mm
2.75-inch rockets	Fwd	14	64	25 mm
Fire bombs	Aft	14	128-200	17-20 mm
Bombs	Aft	52	200	20 mm
CBU's	Aft	05	64-128	25-50 mm

Operation of Combat Documentation Cameras.

PREFLIGHT CHECK. During this check, make sure ground personnel have installed, loaded, and set the cameras according to mission requirements, and that camera pod and doors are secured.

IN-FLIGHT OPERATION. Press trigger or bomb button. Pressing the trigger or bomb button starts forward camera operation and energizes a start-delay relay for the aft camera. At the end of this preset (1 to 30 seconds) delay, aft camera operation begins. Both cameras continue to function for a preset overrun time of 1 to 30 seconds following release of the trigger or bomb button. If only the cameras are to be used, the gun-missile switch should be at SAFE and the armament selector switch should be at OFF, so that only the cameras will be actuated by either detent of the trigger or by pressing the bomb button. To use the cameras during gun-and missile-firing operations, the trigger

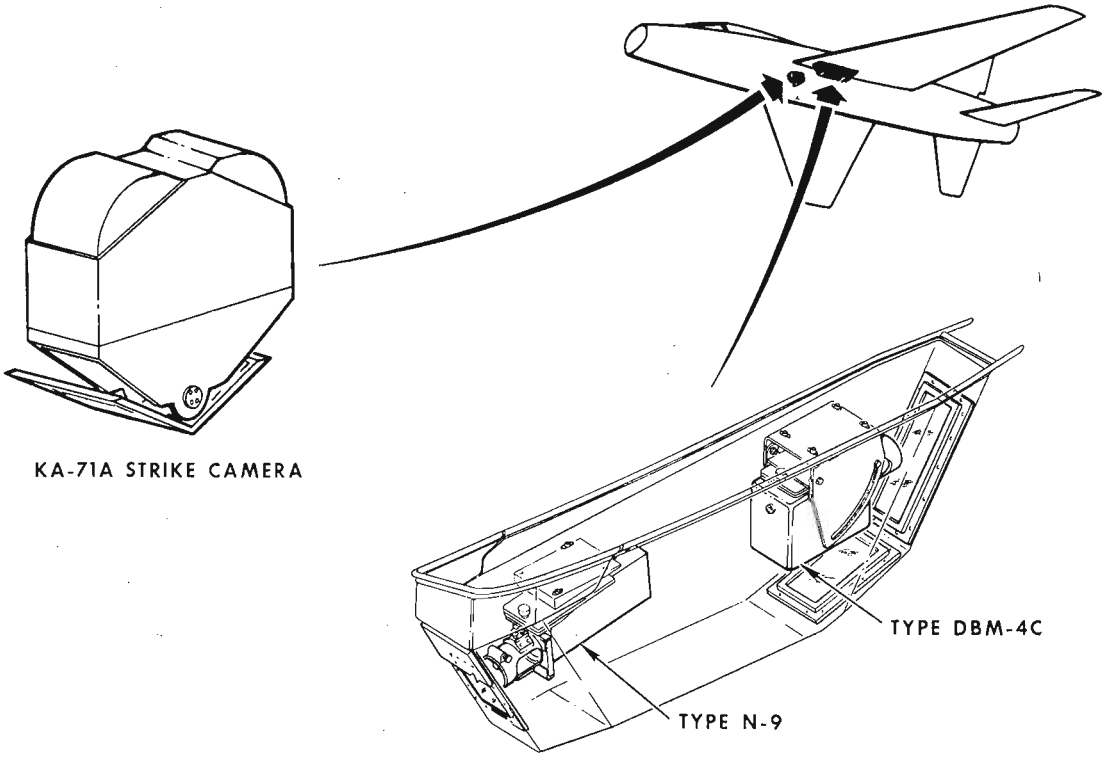


Figure 1-19. Camera Installations

safety switch should be at either the GUNS CAMERA position or the MISSILE CAMERA position. When the trigger is pressed to the first detent, camera operation starts and continues when the trigger is pressed to the second detent to fire the guns or missiles. The cameras can be operated, regardless of armament selector switch position, by pressing the bomb button.

NOTE

If tactical conditions permit, maintain a wings-level attitude from the time the weapon is released to 1 second following weapon impact. This will help to improve assessment of weapon delivery accuracies.

Strike Camera-Airplanes Changed by T.O. 1F-100-977. The electrically operated type KB-18A, 70 mm strike camera (figure 1-19) provides a panoramic capability for high-speed, low-altitude photographic battle damage assessment. The camera has a 3-inch, f 2.8 lens with an automatic exposure control and is in a fixed mount in the underside of the fuselage to the left of the nose gear wheel well. The left-hand landing-taxi light is moved slightly forward in the fuselage to accommodate the camera installation. The landing-taxi light switch function is unchanged. The camera is positioned for presentation of surface area directly below the airplane from the forward horizon to the aft horizon. This is accomplished by a rotating prism that scans 180 degrees during the taking of each photograph. A glass window beneath the camera protects the camera prism. Condensation and frost are kept from forming on the camera window by hot air from the defrosting and anti-icing system. A sensor on the camera window glass causes a control valve to open at 26.7 degrees C, allowing the hot air to flow across the inner surface of the camera window, and close at 37.8 degrees C to shut off the hot airflow. This control valve also can be opened or closed by a sensor in the camera bay. If the temperature in the bay should rise above 51.7 degrees C, the sensor will cause the valve to close and shut off the flow of hot air to the camera window. Cooling air extracted from the midship electronic equipment cooling system provides a continuous flow of cooling air to the camera bay. The temperature control circuit is energized when secondary bus power is applied to the airplane.

Camera shutter speed, lens aperture, and picture sequence (4 cps) are automatic, while camera overrun time (0 to 10 seconds) is preset on the camera before flight. Camera operation is completely automatic and is initiated by pressing the bomb button. There are no other strike camera cockpit controls. The secondary bus provides power for the camera when camera operation is started by the trigger. Primary bus power is used when the bomb button is pressed to start camera operation.

Operation of Strike Camera.

PREFLIGHT CHECK. During this check, make sure ground personnel have installed, loaded, and set the camera according to mission requirements.

IN-FLIGHT OPERATION. Press trigger or bomb button for camera operation. If only the camera is to be used, the gun-missile switch should be at SAFE, and the armament selector switch should be at OFF, so that only the camera will be actuated by either detent of the trigger or by pressing the bomb button. To use the camera during gun- and missile-firing operations, the trigger safety switch should be at either the GUNS CAMERA position or the MISSILES CAMERA position. When the trigger is pressed to the first detent, camera operation starts and continues when the trigger is pressed to the second detent to fire the guns or missiles. The camera can be operated, regardless of armament selector switch position, by pressing the bomb button.

GUNNERY SYSTEM.

On F-100C/D airplanes, four type M-39 20 mm guns are mounted in the lower forward section of the fuselage, two on each side, outboard of the nose wheel well. On F-100F airplanes, two type M-39 or M-39A1 20 mm guns are in the lower section of the fuselage, one on each side. outboard of the nose wheel well. The guns are gas-operated and use electrically detonated ammunition. A maximum of 200 rounds per gun is carried, and the rate of fire is 1,500-1,700 rounds per minute (for an approximate 8 seconds of fire power). All guns are manually charged on the ground. Ammunition is belt-fed to the guns from two compartments behind the cockpit. Expended ammunition links are retained to prevent impact damage to fuselage and tail surfaces. The expended cases, however, are ejected overboard (through tubes having outlets in the fuselage bottom) with sufficient velocity to clear the airplane. The gun, ammunition, and expended link compartments have a purging system for removing explosive gases resulting from gunfiring. The purging system uses air from the engine air intake duct and is actuated automatically during gunfiring. Because of dispersion, the maximum effective gun range is approximately 3,500 feet.

Gunnery System Controls.

TRIGGER SAFETY SWITCH. Electrical power (ac and dc) for operation of the gun camera, guns, and missiles is con-

trolled by secondary bus power through a guarded trigger safety switch. (See figure 1-20.) When the switch is at

Figure 1-20. Trigger Safety Switch

GUNS CAMERA, power is provided to actuate the gun camera, guns, and gun purging system when the trigger is pressed to the first detent. At the second trigger detent, gun camera operation and gun bay purging continues, and power is provided to actuate the guns. With the switch at MISSILES CAMERA, power is supplied to the gun camera at the first trigger detent. Gun camera operation continues when the trigger is pressed to the second detent to fire the missile. Power to the guns and missiles is disconnected when the switch is at CAMERA. However, power is continuously supplied to the gun camera which may then be operated by pressing the trigger to the first or second detent. The gun-firing circuit is inoperative when the weight of the airplane is on the nose gear.

GUN SELECTOR SWITCH – F-100D AIRPLANES. The gun-selector switch (figure 1-21) is on the instrument panel. Turning the switch to UPPER permits firing the two upper guns in pairs. Turning the switch to LOWER permits firing the two lower guns in pairs. With the switch at ALL, the four guns can be fired simultaneously. This switch does not affect, nor is it affected by, the trigger safety switch.

TRIGGER. The gun-firing, missile, and gun camera circuits are energized by the trigger (figure 1-17), which has two detent positions and is powered by the secondary bus. With the trigger safety switch at GUNS CAMERA, the first detent of the trigger energizes the gun camera and the gun purge door selector valve so that utility hydraulic pressure can open the purge door for gun bay purging.

NOTE

If the purge door fails to open, thereby precluding the flow of air to the compartments requiring ventilation, a microswitch prevents gunfiring circuits from being energized.

At the second trigger detent, gun camera operation and gun bay purging continue and ac power is supplied from the gun-firing transformers to fire the cartridges. As the second trigger detent is released, the guns stop firing and a time-delay unit in the purging system circuit keeps the purging system functioning for 5 seconds after the first trigger detent is released. When the trigger safety switch is at CAMERA, only the gun camera will be actuated by either detent of the trigger. Missiles are fired with the trigger pressed to the second detent when the trigger safety switch is at MISSILES CAMERA and the additional required switches are properly positioned.

GROUND FIRE SWITCH. The ground fire switch (figure 1-21B) allows the 20 mm guns to be fired on the ground or AIM-9 missile circuitry to be checked by maintenance personnel. This switch is channel-guarded with a safety pin fastened through holes in the guard. The switch is powered by the secondary bus and is spring-loaded to SAFE. When held at ON, the switch overrides the nose gear safety switch and the purge door circuits.

CAUTION

When the 20 mm guns are fired on the ground, all gun, ammunition, and expended link compartments must be open, as there is not enough airflow to adequately purge the compartments.

- The ground fire switch should not be used in flight, because a gun gas explosion in the gun bay can result.

AIM-9B/E/J Missile System. The F-100C can carry two AIM-9 missiles on an Aero 3B launcher attached to a Type VI launcher/adapter bolted onto the left inboard wing station. The F-100D/F aircraft can carry two AIM-9 missiles on a Type IX launcher at each inboard wing station (total of four missiles). This air-to-air type missile operates on the passive infrared homing principle. The missile is aimed by using the A-4 sight with a mechanically caged reticle. A headset tone generated by the missile and monitored through the communication amplifier informs the pilot that the missile to be launched has detected the target and is receiving an adequate homing signal. This on-target signal does not necessarily indicate that the target is within range.

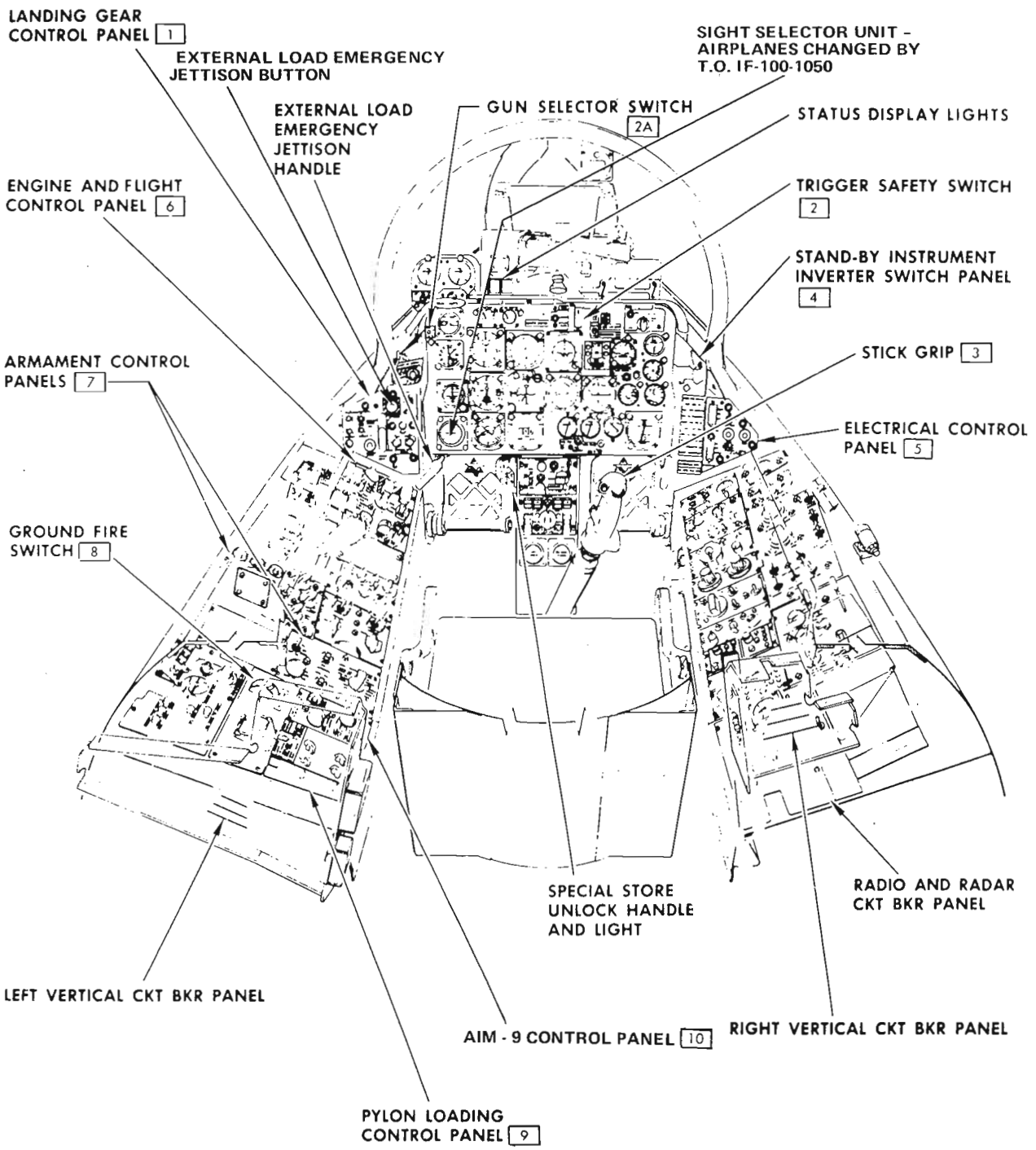
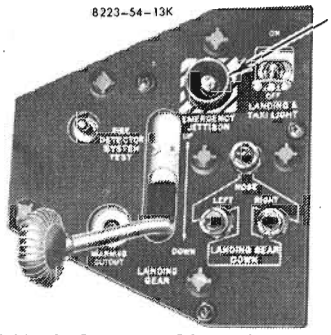
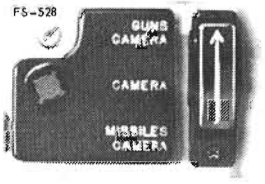

LANDING GEAR CONTROL PANEL 1
EXTERNAL LOAD EMERGENCY JETTISON BUTTON
EXTERNAL LOAD EMERGENCY JETTISON HANDLE
GUN SELECTOR SWITCH 2A
SIGHT SELECTOR UNIT - AIRPLANES CHANGED BY T.O. 1F-100-1050
STATUS DISPLAY LIGHTS
ENGINE AND FLIGHT CONTROL PANEL 6
TRIGGER SAFETY SWITCH 2
STAND-BY INSTRUMENT INVERTER SWITCH PANEL 4
ARMAMENT CONTROL PANELS 7
STICK GRIP 3
ELECTRICAL CONTROL PANEL 5
GROUND FIRE SWITCH 8
SPECIAL STORE UNLOCK HANDLE AND LIGHT
RADIO AND RADAR CKT BKR PANEL
LEFT VERTICAL CKT BKR PANEL
AIM - 9 CONTROL PANEL 10
RIGHT VERTICAL CKT BKR PANEL
PYLON LOADING CONTROL PANEL 9

Figure 1-21. Cockpit View – F-100D Aircraft (Sheet 1 of 2)

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632 (TYPICAL)

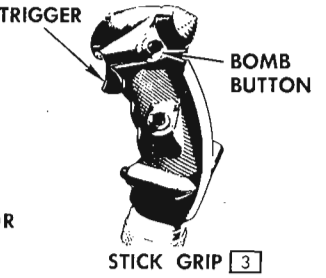


LANDING GEAR CONTROL PANEL [1]

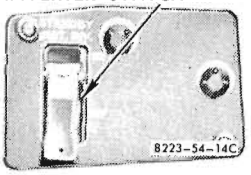


TRIGGER SAFETY SWITCH [2]

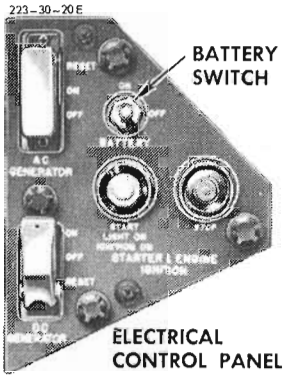
GUN SELECTOR SWITCH [2A]



STICK GRIP [3]

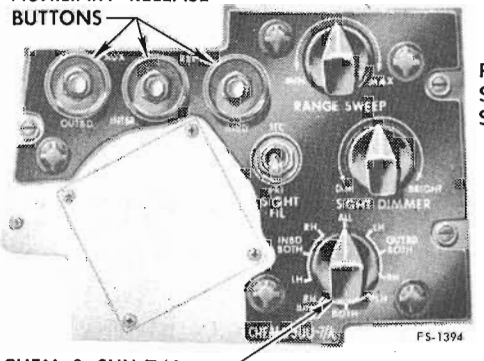


STAND-BY INSTRUMENT INVERTER SWITCH PANEL [4]

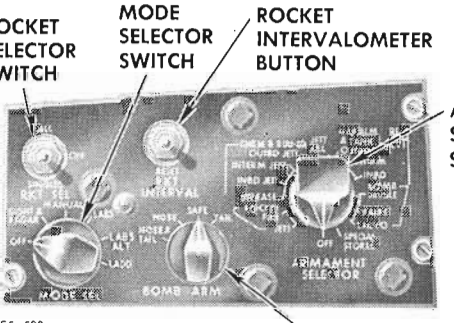


ELECTRICAL CONTROL PANEL [5]

ENGINE AND FLIGHT CONTROL PANEL [6]

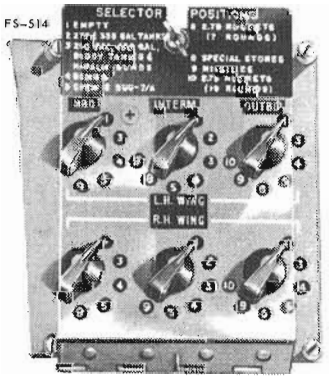


CHEM & SUU-7/A SELECTOR SWITCH

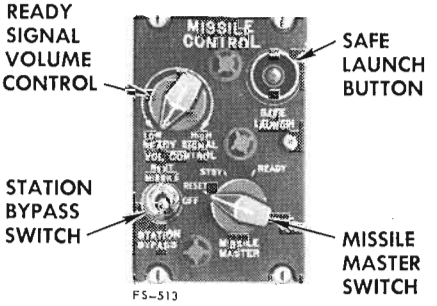


GROUND-FIRE SWITCH [8]

ARMAMENT CONTROL PANELS [7]



PYLON LOADING CONTROL PANEL [9]



AIM-9B/E CONTROL PANEL [10]

100C-33-2-224B

Figure 1-21. Cockpit View – F-100D Aircraft (Sheet 2 of 2)

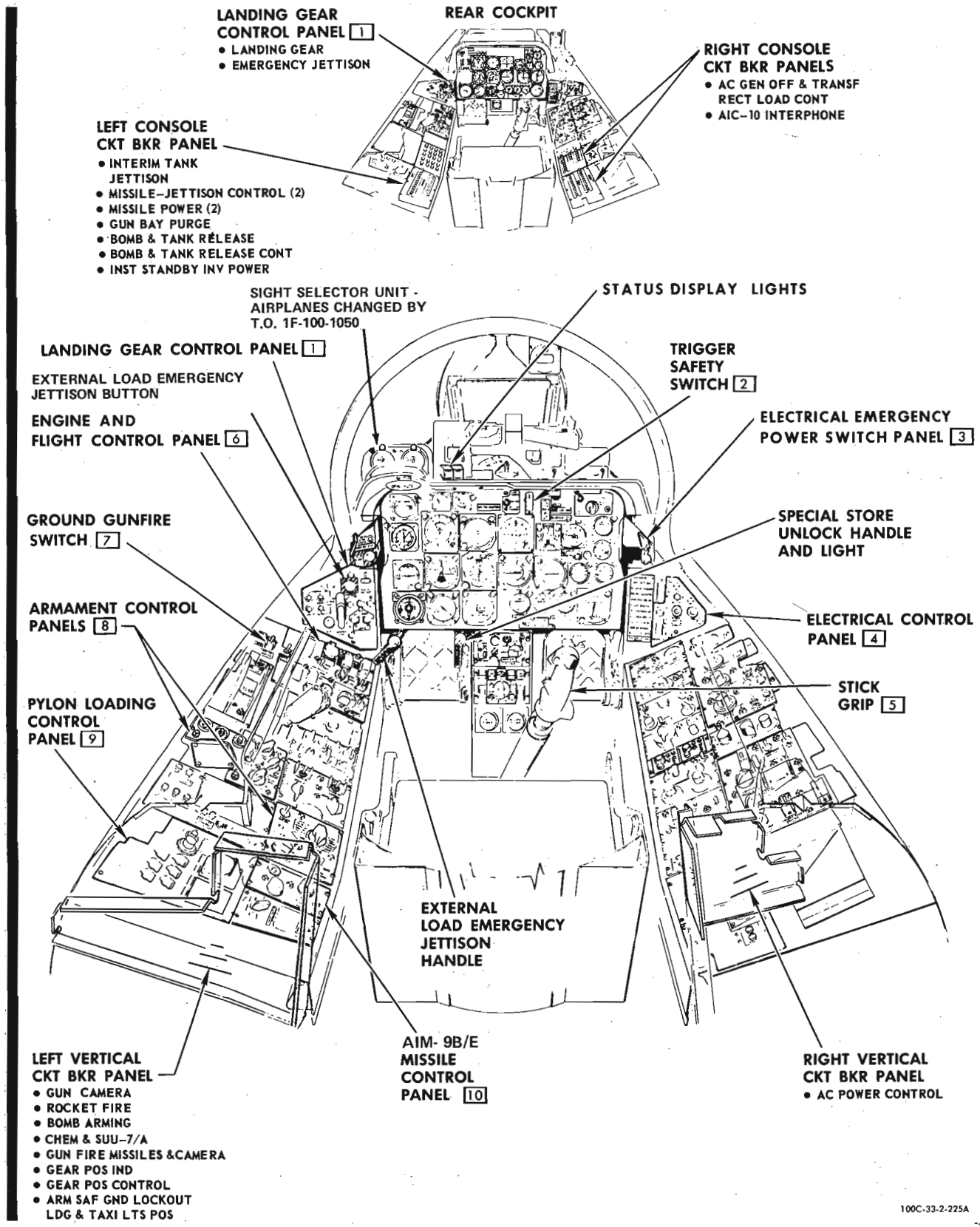

LANDING GEAR CONTROL PANEL 1
• LANDING GEAR
• EMERGENCY JETTISON
REAR COCKPIT
RIGHT CONSOLE CKT BKR PANELS
• AC GEN OFF & TRANSF RECT LOAD CONT
• AIC-10 INTERPHONE
LEFT CONSOLE CKT BKR PANEL
• INTERIM TANK JETTISON
• MISSILE-JETTISON CONTROL (2)
• MISSILE POWER (2)
• GUN BAY PURGE
• BOMB & TANK RELEASE
• BOMB & TANK RELEASE CONT
• INST STANDBY INV POWER
SIGHT SELECTOR UNIT - AIRPLANES CHANGED BY T.O. 1F-100-1050
STATUS DISPLAY LIGHTS
LANDING GEAR CONTROL PANEL 1
TRIGGER SAFETY SWITCH 2
EXTERNAL LOAD EMERGENCY JETTISON BUTTON
ELECTRICAL EMERGENCY POWER SWITCH PANEL 3
ENGINE AND FLIGHT CONTROL PANEL 6
SPECIAL STORE UNLOCK HANDLE AND LIGHT
GROUND GUNFIRE SWITCH 7
ELECTRICAL CONTROL PANEL 4
ARMAMENT CONTROL PANELS 8
STICK GRIP 5
PYLON LOADING CONTROL PANEL 9
EXTERNAL LOAD EMERGENCY JETTISON HANDLE
AIM-9B/E MISSILE CONTROL PANEL 10
LEFT VERTICAL CKT BKR PANEL
• GUN CAMERA
• ROCKET FIRE
• BOMB ARMING
• CHEM & SUU-7/A
• GUN FIRE MISSILES &CAMERA
• GEAR POS IND
• GEAR POS CONTROL
• ARM SAF GND LOCKOUT LDG & TAXI LTS POS
RIGHT VERTICAL CKT BKR PANEL
• AC POWER CONTROL
100C-33-2-225A

Figure 1-21A. Cockpit View – F-100F Aircraft (Sheet 1 of 2)

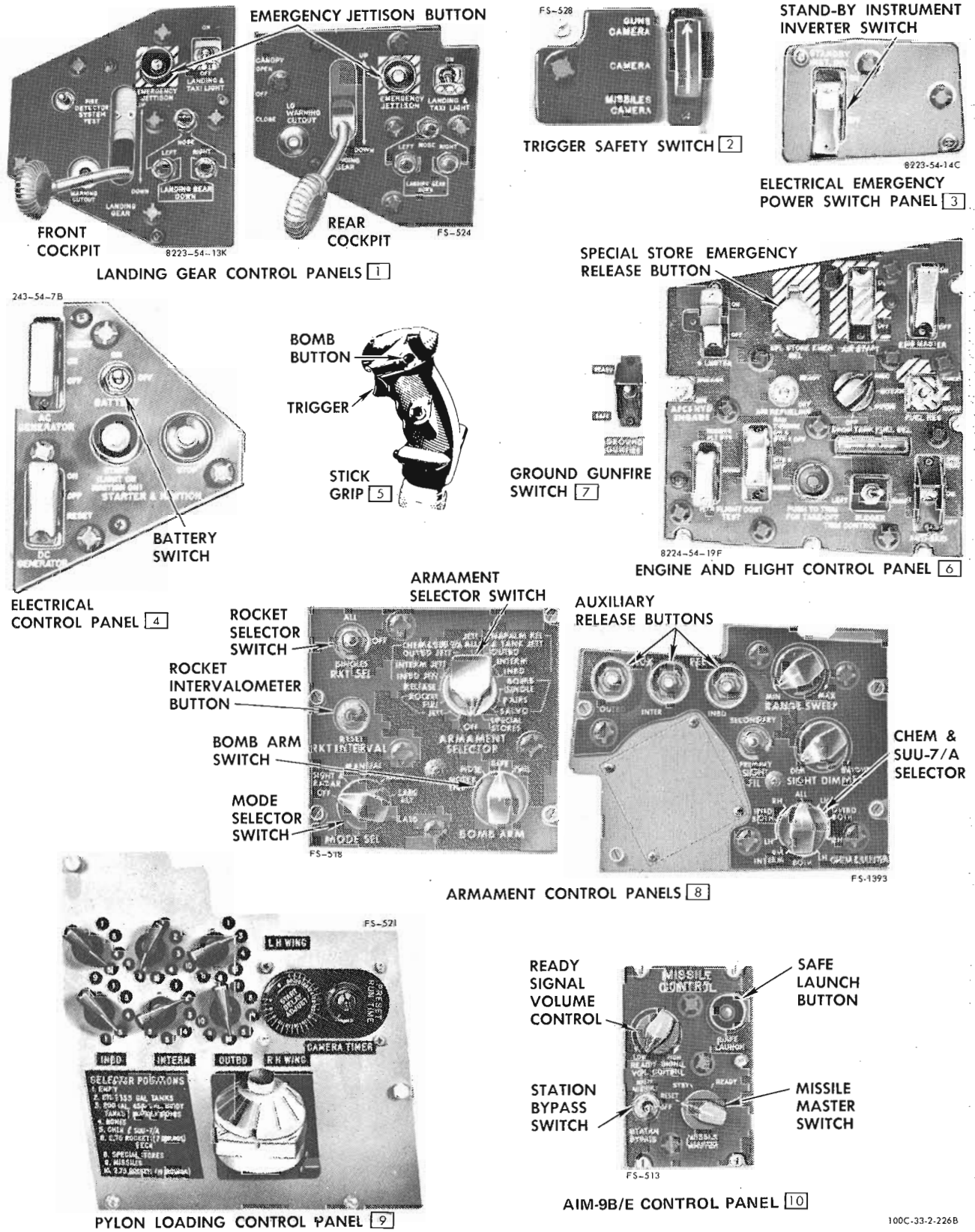


Figure 1-21A. Cockpit View – F-100F Aircraft (Sheet 2 of 2)

AIRPLANES CHANGED BY T.O. 1F-100D-632 (TYPICAL)

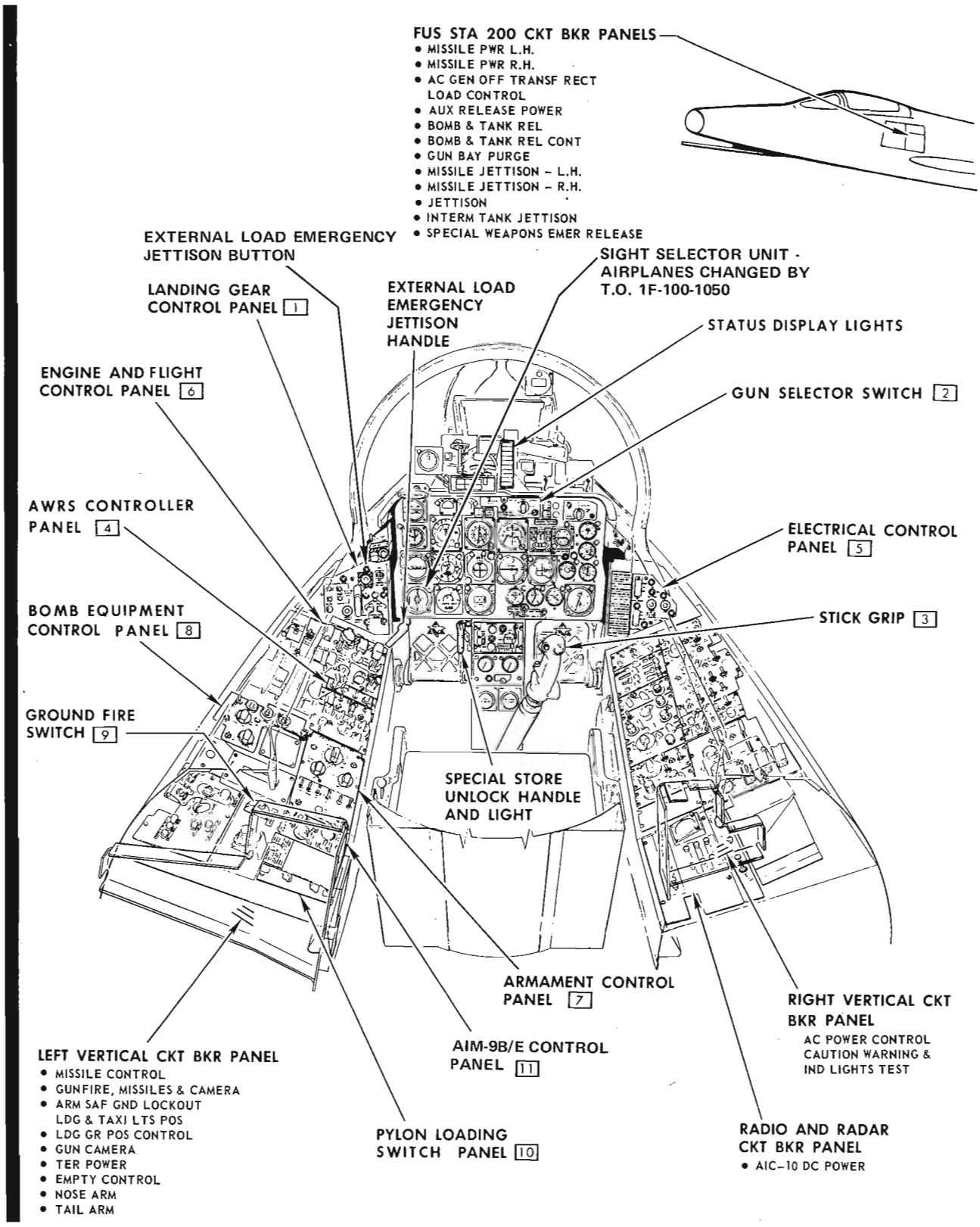
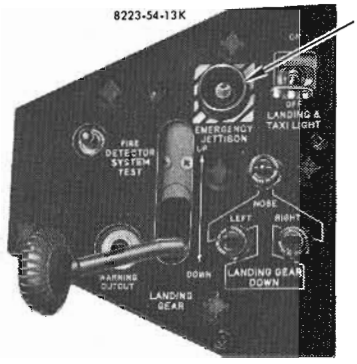

FUS STA 200 CKT BKR PANELS
• MISSILE PWR L.H.
• MISSILE PWR R.H.
• AC GEN OFF TRANSF RECT LOAD CONTROL
• AUX RELEASE POWER
• BOMB & TANK REL
• BOMB & TANK REL CONT
• GUN BAY PURGE
• MISSILE JETTISON – L.H.
• MISSILE JETTISON – R.H.
• JETTISON
• INTERM TANK JETTISON
• SPECIAL WEAPONS EMER RELEASE
EXTERNAL LOAD EMERGENCY JETTISON BUTTON
SIGHT SELECTOR UNIT - AIRPLANES CHANGED BY T.O. 1F-100-1050
LANDING GEAR CONTROL PANEL 1
EXTERNAL LOAD EMERGENCY JETTISON HANDLE
STATUS DISPLAY LIGHTS
ENGINE AND FLIGHT CONTROL PANEL 6
GUN SELECTOR SWITCH 2
AWRS CONTROLLER PANEL 4
ELECTRICAL CONTROL PANEL 5
BOMB EQUIPMENT CONTROL PANEL 8
STICK GRIP 3
GROUND FIRE SWITCH 9
SPECIAL STORE UNLOCK HANDLE AND LIGHT
ARMAMENT CONTROL PANEL 7
RIGHT VERTICAL CKT BKR PANEL
AC POWER CONTROL
CAUTION WARNING & IND LIGHTS TEST
AIM-9B/E CONTROL PANEL 11
LEFT VERTICAL CKT BKR PANEL
• MISSILE CONTROL
• GUNFIRE, MISSILES & CAMERA
• ARM SAF GND LOCKOUT LDG & TAXI LTS POS
• LDG GR POS CONTROL
• GUN CAMERA
• TER POWER
• EMPTY CONTROL
• NOSE ARM
• TAIL ARM
PYLON LOADING SWITCH PANEL 10
RADIO AND RADAR CKT BKR PANEL
• AIC-10 DC POWER
100D(I)-33-2-1A

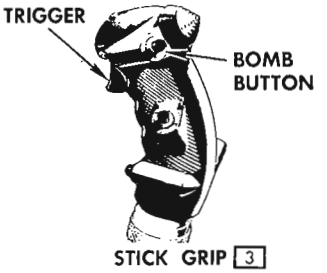
Figure 1-21B. Cockpit View – F-100D Aircraft (Sheet 1 of 2)

AIRPLANES CHANGED BY T.O. 1F-100D-632 (TYPICAL)

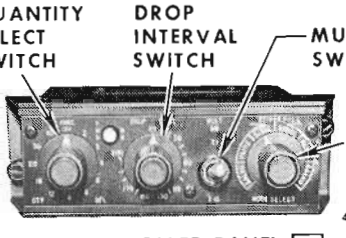


LANDING GEAR CONTROL PANEL [1]

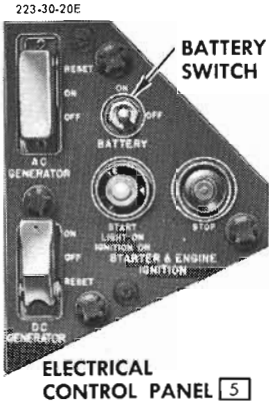
GUN SELECTOR SWITCH PANEL [2]



STICK GRIP [3]

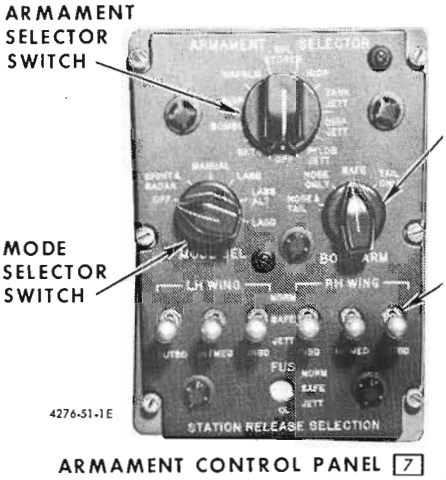


AWRS CONTROLLER PANEL [4]

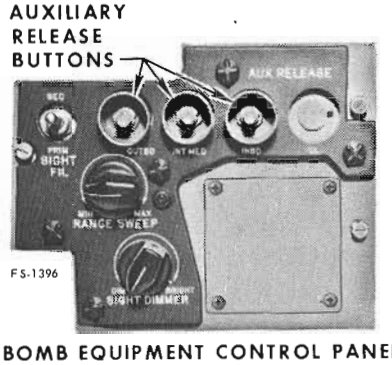


ELECTRICAL CONTROL PANEL [5]

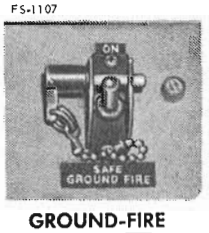
ENGINE AND FLIGHT CONTROL PANEL [6]



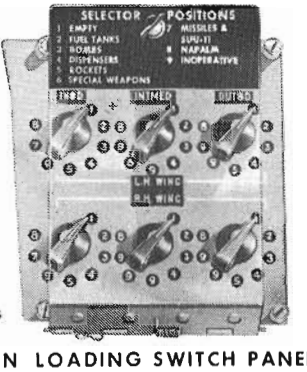
ARMAMENT CONTROL PANEL [7]



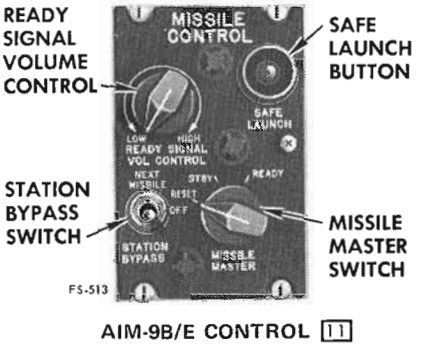
BOMB EQUIPMENT CONTROL PANEL [8]



GROUND-FIRE SWITCH [9]



PYLON LOADING SWITCH PANEL [10]



AIM-9B/E CONTROL [11]

100D(I)-33-2-2A

Figure 1-21B. Cockpit View – F-100D Aircraft (Sheet 2 of 2)

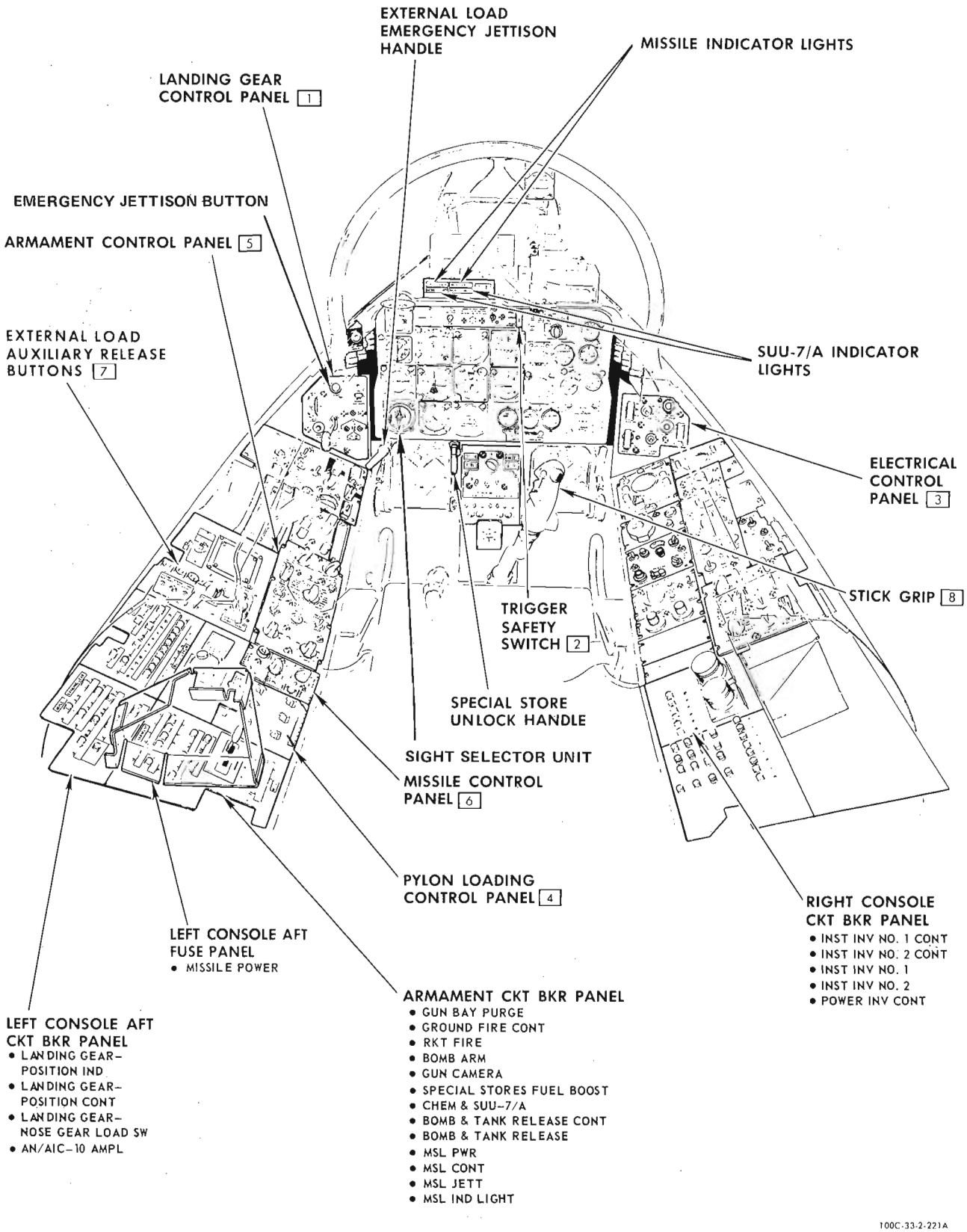
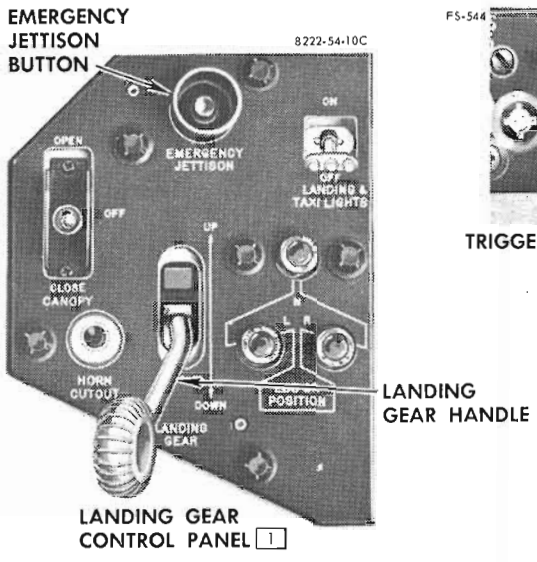
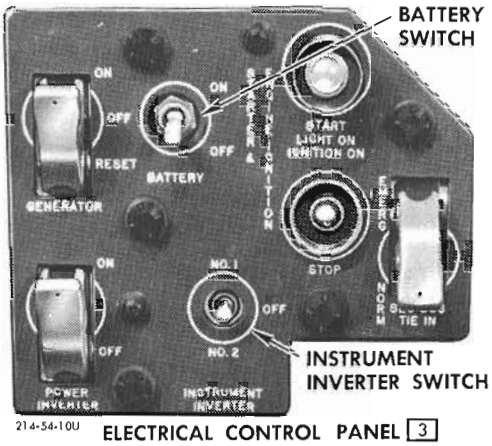

EXTERNAL LOAD EMERGENCY JETTISON HANDLE
MISSILE INDICATOR LIGHTS
LANDING GEAR CONTROL PANEL 1
EMERGENCY JETTISON BUTTON
ARMAMENT CONTROL PANEL 5
EXTERNAL LOAD AUXILIARY RELEASE BUTTONS 7
SUU-7/A INDICATOR LIGHTS
ELECTRICAL CONTROL PANEL 3
STICK GRIP 8
TRIGGER SAFETY SWITCH 2
SPECIAL STORE UNLOCK HANDLE
SIGHT SELECTOR UNIT
MISSILE CONTROL PANEL 6
PYLON LOADING CONTROL PANEL 4
RIGHT CONSOLE CKT BKR PANEL
• INST INV NO. 1 CONT
• INST INV NO. 2 CONT
• INST INV NO. 1
• INST INV NO. 2
• POWER INV CONT
LEFT CONSOLE AFT FUSE PANEL
• MISSILE POWER
ARMAMENT CKT BKR PANEL
• GUN BAY PURGE
• GROUND FIRE CONT
• RKT FIRE
• BOMB ARM
• GUN CAMERA
• SPECIAL STORES FUEL BOOST
• CHEM & SUU-7/A
• BOMB & TANK RELEASE CONT
• BOMB & TANK RELEASE
• MSL PWR
• MSL CONT
• MSL JETT
• MSL IND LIGHT
LEFT CONSOLE AFT CKT BKR PANEL
• LANDING GEAR-POSITION IND
• LANDING GEAR-POSITION CONT
• LANDING GEAR-NOSE GEAR LOAD SW
• AN/AIC-10 AMPL
100C-33-2-221A

Figure 1-21C. Cockpit View – F-100C Aircraft (Sheet 1 of 2)

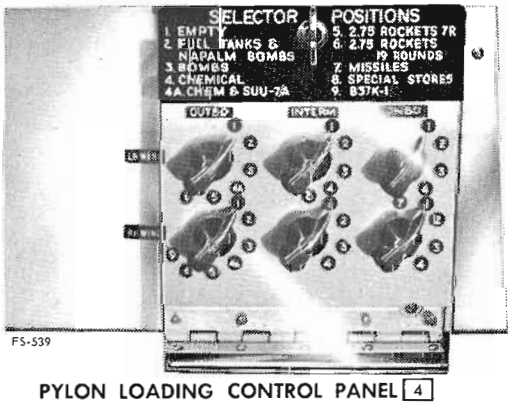


LANDING GEAR CONTROL PANEL [1]

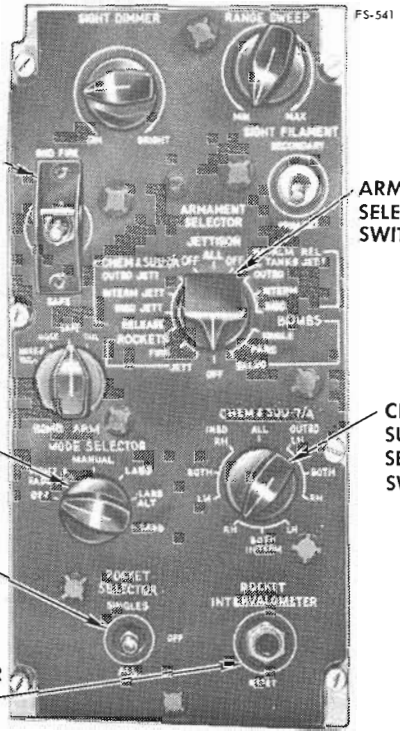
TRIGGER SAFETY SWITCH [2]



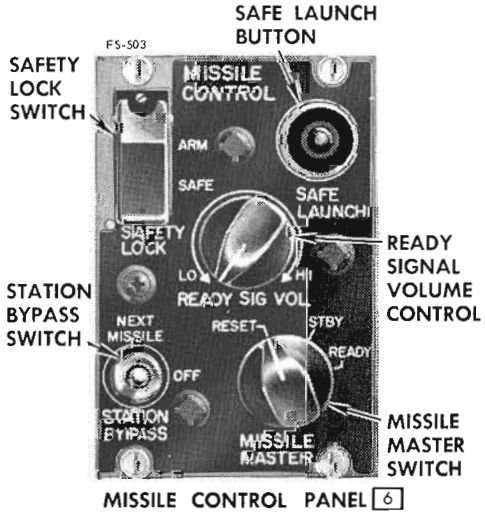
ELECTRICAL CONTROL PANEL [3]



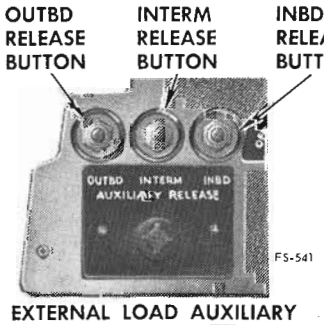
PYLON LOADING CONTROL PANEL [4]



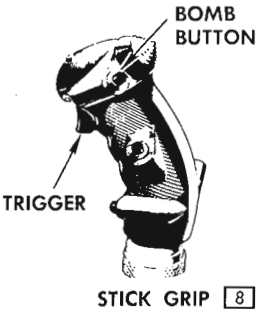
ARMAMENT CONTROL PANEL [5]



MISSILE CONTROL PANEL [6]



EXTERNAL LOAD AUXILIARY RELEASE BUTTONS [7]



STICK GRIP [8]

Figure 1-21C. Cockpit View – F-100C Aircraft (Sheet 2 of 2)

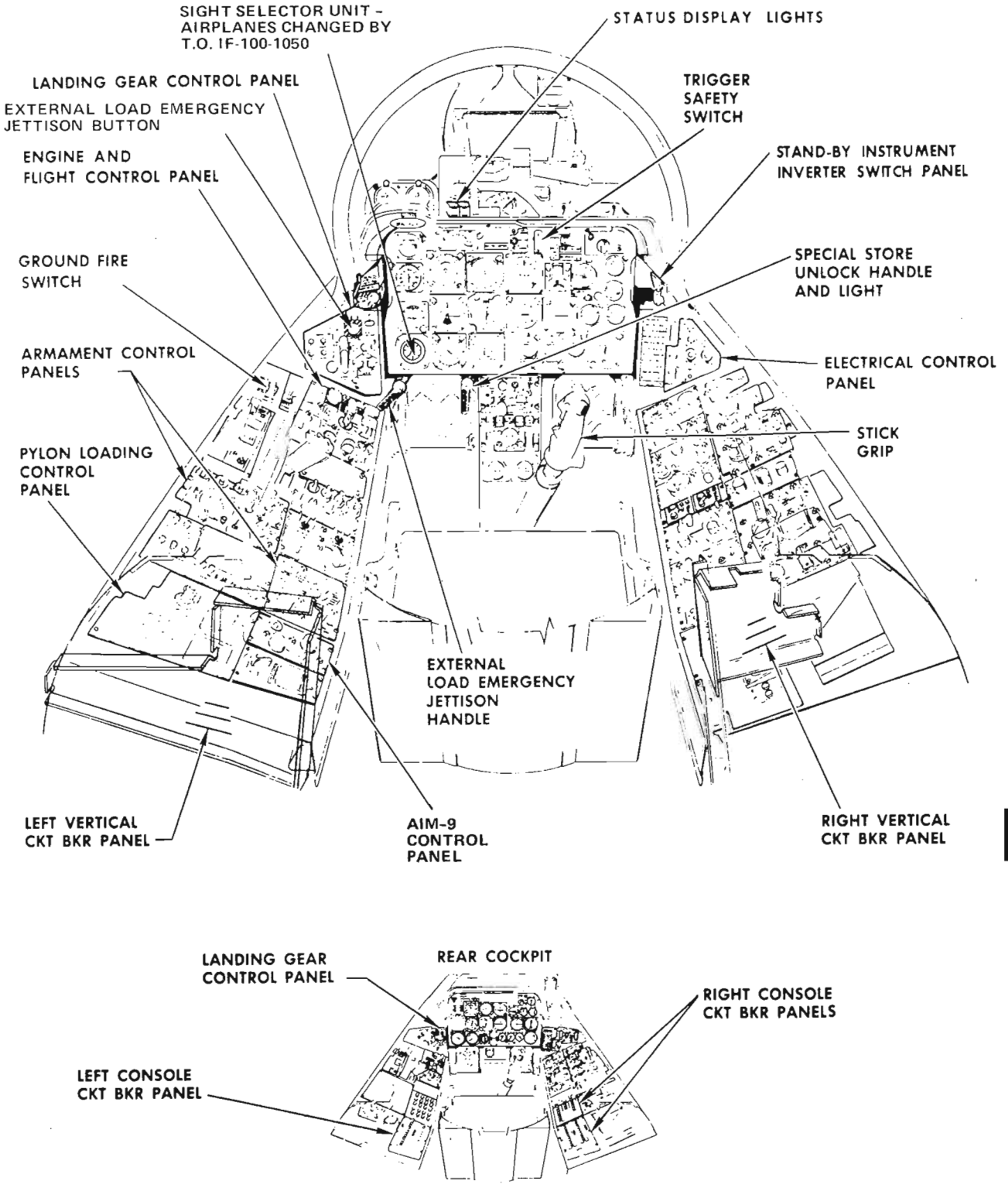

SIGHT SELECTOR UNIT - AIRPLANES CHANGED BY T.O. 1F-100-1050
STATUS DISPLAY LIGHTS
LANDING GEAR CONTROL PANEL
EXTERNAL LOAD EMERGENCY JETTISON BUTTON
TRIGGER SAFETY SWITCH
ENGINE AND FLIGHT CONTROL PANEL
STAND-BY INSTRUMENT INVERTER SWITCH PANEL
GROUND FIRE SWITCH
SPECIAL STORE UNLOCK HANDLE AND LIGHT
ARMAMENT CONTROL PANELS
ELECTRICAL CONTROL PANEL
STICK GRIP
PYLON LOADING CONTROL PANEL
EXTERNAL LOAD EMERGENCY JETTISON HANDLE
LEFT VERTICAL CKT BKR PANEL
AIM-9 CONTROL PANEL
RIGHT VERTICAL CKT BKR PANEL
LANDING GEAR CONTROL PANEL
REAR COCKPIT
RIGHT CONSOLE CKT BKR PANELS
LEFT CONSOLE CKT BKR PANEL

Figure 1-22. Cockpit View – F-100F (Typical)

A TDU-11/B 5-inch HVA rocket can be used as a practice target for the AIM-9 missile. The TDU-11/B contains no warhead or explosives. Four tracking flares are attached to the rocket aft section. For correct firing sequence (TDU, followed by AIM-9) with a minimum manipulation of controls, the TDU target rocket(s) and AIM-9 missile(s) must be installed at the proper positions. For the F-100C, the TDU must be on the inboard launcher. For the F-100D/F, see figure 1-23.

AIM-9B/E/J Missile System Controls and Indicators.

MISSILE MASTER SWITCH. Warmup power to the missile electronic components and gyros is provided directly, regardless of the position of the missile master switch. (See figure 1-24.) Turning the switch to RESET resets the sequence relay to missile No. 1. Turning the switch to STBY allows the missile audio signal tone to be heard in the headset. All components that receive power in the reset and standby modes are powered when the switch is at READY. In addition, the missile arming circuit is energized. The missile master switch is powered by the secondary bus.

SAFETY LOCK SWITCH (F-100C ONLY). The safety lock switch (figure 1-25) is powered by the primary bus. The switch has an armed position, labeled "ARM", and a guarded safe position, labeled "SAFE". Raising the guard and moving the switch to ARM (missile master switch READY) completes the missile firing circuit. If it is desired to abort a firing, the safety lock switch is moved to SAFE.

STATION BYPASS SWITCH. The station bypass switch (figure 1-24) is powered by the secondary bus. When the switch is held at NEXT MISSILE, a faulty missile can be bypassed and the next missile in a preset sequence can be selected for launching. If the switch is used for each missile, down to the last missile, the launching circuits cycle back to the first missile so that a second attempt may be made to launch any misfired missile. The switch is spring-loaded to OFF.

READY SIGNAL VOLUME CONTROL. This rheostat (figure 1-24) provides a volume control for the audio signal generated by the missile.

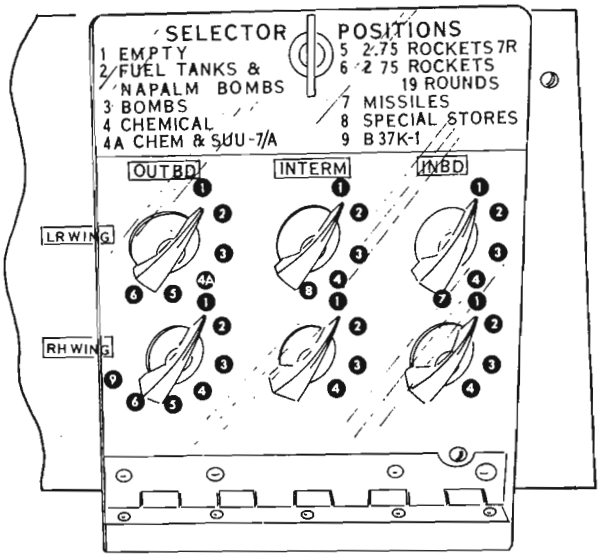
WING STATION (LOOKING FROM AFT TO FORWARD)

LEFT INBOARD	RIGHT INBOARD	STATUS DISPLAY LIGHT	TRIGGER	ACTION
AIM-9 ② ① TDU		①	Press once	Fire TDU
		②	Release, Press again	Fire missile
	AIM-9 ④ ③ TDU	③	Press once	Fire TDU
		④	Release, Press again	Fire missile
AIM-9 ② ① TDU	AIM-9 ④ ③ TDU	①	Press once	Fire TDU
		②	Release, Press again	Fire missile
		③	Release, Press again	Fire TDU
		④	Release, Press again	Fire missile
TDU ②	③ AIM-9	②	Press once	Fire TDU
		③	Release, Press again	Fire missile

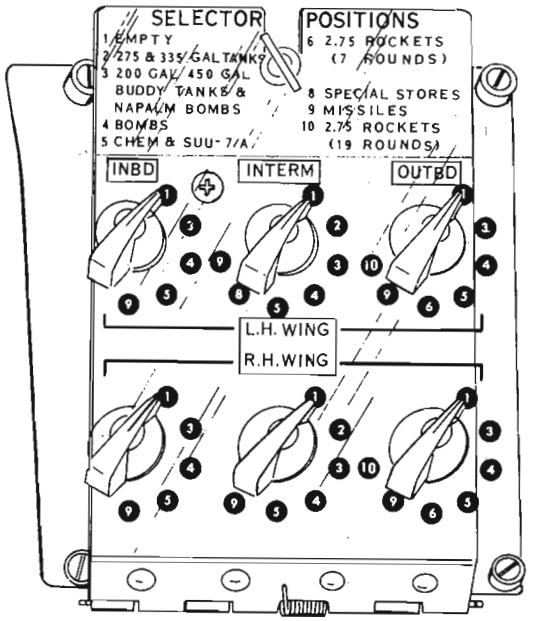
NOTE

Circled numbers show missile lights that correspond to launcher stations.

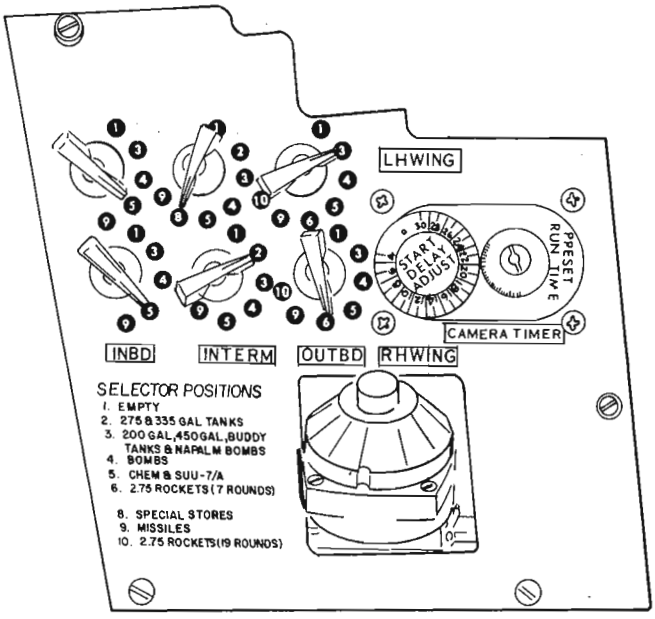
Figure 1-23. TDU-11/B-AIM-9B/E/J Firing Order F-100D/F Aircraft



F-100C



F-100D



F-100F

Figure 1-27. Pylon Loading Control Panel

NOTE

On some airplanes,* when WADD 200-gallon or type II 275-gallon drop tanks are installed, at the intermediate stations, the intermediate station pylon loading switches should be at 200 GAL, 450 GAL, BUDDY TANKS & NAPALM BOMBS position. With the pylon loading switches in this position, the autopilot G-limiter settings will be within the allowable G-limits for Type II drop tanks.

- To best utilize the G-limiter capabilities of the airplane, the switch should be at EMPTY only when no load is carried at the respective station. (EMPTY does not refer to empty drop tank, but to an empty load station.) When the pitch damper or autopilot is engaged and the mission requires higher G-limits, if type III 275- or 335-gallon drop tanks are carried at the intermediate stations, the intermediate station pylon loading switches should be at EMPTY. However, if selective jettisoning (armament selector switch positioning and bomb button) is desired, the pylon loading selector switches must be returned to the No. 2 position.

- When the SUU-21/A dispenser is carried at the left intermediate wing station, the left intermediate wing station pylon loading selector switch must be set at SPECIAL STORES.

- Although the missile circuitry does not go through the pylon loading selector switches, the switches should be set at MISSILES for consistency with other armament procedures.

WARNING

Do not change setting of pylon loading selector switches, because loads may release when switches are reset. If selector switch setting does not correspond to the load on the respective wing station, maintenance personnel must make a check of applicable electrical circuits before selector switches are repositioned.

*F-100D-56 and F-100D-61 Airplanes

ARMAMENT SELECTOR SWITCH. This rotary switch (figure 1-15), powered by the primary and secondary busses, determines the external load released when using the bomb button. Regardless of the release method used, external loads leave the airplane in various fixed and preset sequences as shown in figure 1-28. When the armament selector switch is at BOMB-SINGLE, a single bomb drops (except outboard station bombs, which drop as a pair) each time the button is pressed. When the armament selector switch is at BOMB-SINGLE, a single bomb drops (except outboard station bombs, which drop as a pair) each time the bomb button is pressed. When the armament selector switch is at BOMB-PAIRS, symmetrical pairs of bombs drop each time the bomb button is pressed, all bombs drop simultaneously; however, loads other than bombs stay on the airplane. Bombs can be salvoed armed or safe, depending on the position of the bomb arming switch. With the armament selector switch at either NAPALM REL & TANK JETT-OUTBD, -INTERM, or -INBD, the selected pair of drop tanks or fire bombs is jettisoned when the bomb button is pressed. The 200-gallon drop tanks (and 450-gallon drop tanks, carried at the intermediate station only) are jettisoned by electrically fired ejector cartridges within the pylons.

The 275- and 335-gallon drop tanks (and pylons; F-100D/F) are solenoid-released and freefall from the air plane. On F-100D/F aircraft, the "buddy" refueling drop tanks and pylons are jettisoned by electrically fired ejection cartridges or are solenoid-released and freefall from the airplane, depending on the quantity of fuel remaining in the tank. When the switch is at JETT ALL (the switch must be lifted to obtain this position), and the bomb button is pressed, all external loads, except missiles, are jettisoned safe from F-100C aircraft, and all external loads and pylons, except special stores and their pylons, are jettisoned safe from F-100D/F aircraft.

NOTE

(F-100D/F Only) The special store unlock handle must be actuated to insure jettison of type VII or VIIA pylons or type VIII series pylons that carried no store or that carried a special store which had previously been released.

External loads requiring force ejection are jettisoned at a 1/2-second delay between symmetrical pairs to reduce recoil loads on the wing structure. The SPECIAL STORES position is used when cycling the SUU-21/A dispenser on F-100D/F airplanes.

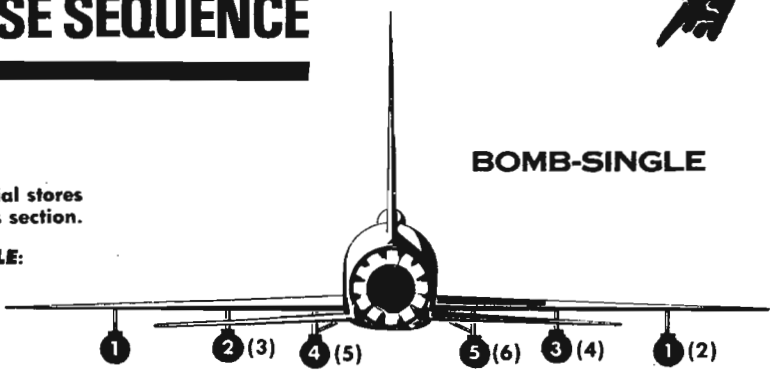
EXTERNAL LOAD RELEASE SEQUENCE

NOTE

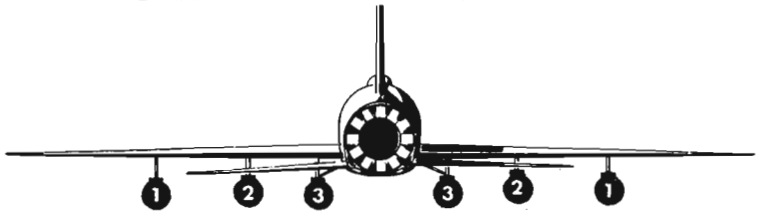
This information does not cover release of special stores and their pylons. Refer to "Special Store" in this section.

ARMAMENT SELECTOR SWITCH AT *BOMB-SINGLE*: **Releases both outboard bombs at the same time (first the left outboard, then the right outboard on F-100D Airplanes changed by T.O. 1F-100-1032) then releases remaining bombs in a fixed dropping order each time the bomb button is pressed. Pylons are retained**

BOMB-SINGLE



BOMB PAIRS, AUXILIARY, AND SELECTIVE RELEASE



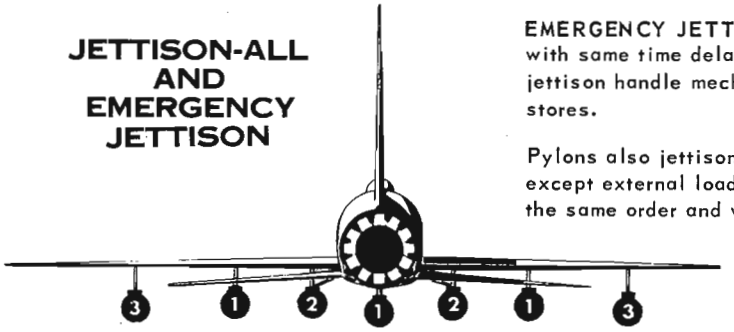
ARMAMENT SELECTOR SWITCH AT *BOMB-PAIRS*: **Releases symmetrical pairs of bombs in a fixed dropping order each time the bomb button is pressed. Pylons are retained.**

AUXILIARY RELEASE: Recommended release sequence for all loads, using the auxiliary release buttons. Pylons are retained.

SELECTIVE RELEASE: Recommended sequence when the pilot chooses station and load with the armament selector switch (such as *NAPALM REL & TANK JETT OUTBD*) and presses the bomb button. Pylons are retained.

ARMAMENT SELECTOR SWITCH AT JETT ALL (PYLON JETT*): Jettisons all loads at 1/2-second intervals between symmetrical pairs when bomb button is pressed. (Jettisons all selected pylons, with stores installed*).

JETTISON-ALL AND EMERGENCY JETTISON



EMERGENCY JETTISON: Emergency jettison button jettisons all loads with same time delay and sequency as JETT ALL method. Emergency jettison handle mechanically releases non-nuclear "free-fall" type stores.

Pylons also jettison after loads are released by any jettison method except external load emergency jettison handle. Pylons jettison in the same order and with the same time delay as loads.

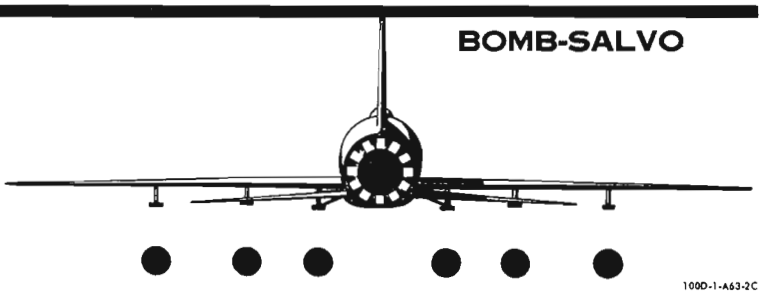
NOTE

The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons.

*airplanes changed by T.O. 1F-100D-632.

ARMAMENT SELECTOR SWITCH AT *BOMB-SALVO*: **Releases all bombs at the same time when bomb button is pressed. Pylons are retained.**

BOMB-SALVO



100D-1-A63-2C

Figure 1-28.

CAUTION

(F-100D/F Only) When carrying an SUU-21/A dispenser at the fuselage centerline station, and a bomb or bombs at any wing station (any pylon loading selector switch at the No. 4 position), the wing-carried bomb(s) should be released before dispensing bombs from the dispenser. This is necessary to prevent one or more of the wing-carried bombs releasing simultaneously with the bomb from the SUU-21/A dispenser.

When the switch is at OFF, the circuits are de-energized and the bomb button is inoperative.

BOMB ARMING SWITCH. The bomb arming switch is a four-position switch which receives its power from the secondary bus (see figure 1-15). The switch allows power to operate electrical solenoids which mechanically arm the stores upon release. With any of the three arming positions selected, arming of the respective fuze(s) will begin upon store release. Stores are released unarmed if the switch is in the SAFE position. Bomb arming is effective only when the armament selector switch is at BOMBS or NAPALM, and the external load emergency jettison handle is in the normal stowed position.

BOMB BUTTON. Store release circuits and chemical tank discharge circuits are energized (with the armament selector switch properly positioned) by secondary bus power (F-100C) or primary bus power (F-100D/F) when the bomb button (figure 1-14) on the control stick grip is pressed. If desired, all external nonnuclear loads (and pylons; F-100 D/F) can be jettisoned by pressing the bomb button with the armament selector switch at JETT ALL. The weapons are jettisoned safe.

WARNING

Before pressing bomb button, make sure armament selector switch is positioned for desired release function. Failure to check switch position could cause accidental bomb or rocket release or failure of desired load to release.

BOMB RELEASE MODE SELECTOR SWITCH. A selector switch (figure 1-15) is used to select the mode of bomb release desired and to control the operation of the fire control system by means of secondary bus power (F-100C) or primary bus power (F-100D/F). When the switch is at SIGHT & RADAR, power is supplied to the radar subsystem. When the selector switch is at MANUAL, the bomb button is energized. With the switch at any position other than OFF, power is supplied to the sight; however, when the switch is at MANUAL, power is supplied to the sight only if the bomb arming switch is at an arming position, and the armament selector switch is at BOMBS or NAPALM position.

EXTERNAL LOAD AUXILIARY RELEASE BUTTONS. The three external load auxiliary release buttons (figure 1-15) provide separate release circuits to fire the second cartridge in the pylons. Powered by the primary bus and enclosed in individual ring guards, these buttons should be used if loads are not released by the normal electrical release circuits. Pressing the OUTBD, INTER, and INBD button releases the pair of external loads (except AIM-9B missiles, SUU-21/A dispenser, and nuclear weapons) carried at the respective stations. Nonnuclear loads are released armed or safe (depending on the position of the bomb-arming switch) and are either forcibly ejected or gravity-released as required for clean separation. The pylons are not released by the auxiliary release buttons on F-100D/F airplanes.

NOTE

A ground safety feature prevents release of external loads by use of the auxiliary release buttons, under any conditions, while the weight of the airplane is on the landing gear.

CAUTION

Do not press more than one auxiliary release button at a time. The combined recoil of ejector cartridges for stores that require the full force of the ejector cartridges produces stresses that can damage the wing structure. This does not include stores loaded "low-blow", since they do not require the full force of the ejector cartridge for release.

EXTERNAL LOAD EMERGENCY JETTISON BUTTON. All external loads (and pylons; F-100D/F) (except nuclear weapons and their pylons) are jettisoned by pressing the external load emergency jettison button. (See figures 1-21 and 1-22.)

NOTE

(F-100D/F Only) The special store unlock handle must be actuated to insure jettison of type VII or VIIA pylons of type VIII series pylons that carried no store or that carried a special store which had previously been released.

Regardless of the position of the bomb-arming switch, all ordnance loads jettison safe. The bomb release sequence is shown in figure 1-28. The external load emergency jettison button is powered by the battery bus; however, primary bus power is required on 100 D/F airplanes to energize relays in the type VIII series pylons to jettison the pylons. If the engine is running and the battery switch is OFF, the primary bus will be energized by the dc generator, or the transformer-rectifier if the dc generator fails. The armament circuit wiring prevents the inadvertent jettisoning of "hung" stores after the release circuit has been actuated, but the cartridge has failed to fire.

WARNING

Pylons (f-100D/F Only) and external loads can be jettisoned electrically by use of the external load emergency jettison button when the airplane is on the ground, because these jettison circuits are not safetied through the nose gear.

EXTERNAL LOAD EMERGENCY JETTISON HANDLE. Pulling the external load emergency jettison handle (figures 1-21 and 1-22) mechanically releases all bombs (except nuclear weapons and SUU-21/A, and CBU dispensers) and/or the 275- or 335-gallon drop tanks. The emergency jettison handle must be pulled to its full extension of about 10 inches. Bomb-arming circuits are interrupted automatically when the emergency jettison handle is pulled, and bombs jettison safe, regardless of the position of the bomb-arming switch.

SPECIAL STORE UNLOCK HANDLE. Although the primary function of the special store unlock handle (figures 1-21 and 1-22) is to control release of the special store, the handle must also be actuated to insure jettison of type VII or VIIA pylons or type VII series pylons that carried no store or that carried a special store which had previously been released.

CAUTION

(F-100F/D Only) The special store unlock handle must be stowed when the SUU-21/A dispenser is carried at the fuselage centerline station. If the special store unlock handle is in the unlocked position when the button is pressed, the dispenser will be released from the pylon and may strike the airplane.

NOTE

F-100D/F Only) The special store unlock handle must be actuated to insure jettison of type VII or VIIA pylons or type VIII series pylons that carried no special store or that carried a special store which had previously been released.

ROCKET SYSTEM. The airplane can carry two LAU-3/A rocket launchers, each containing nineteen 2.75 inch FFA rockets; or two LAU-32A/A, B/A, -59/A, or -68A/A rocket launchers, each containing seven 2.75-inch FFA rockets. The LAU-32A/A, -32B/A, -59/A or -68A/A launchers can be attached directly to the outboard wing pylons without the use of adapters. Controls are provided for normal or emergency rocket release. The AN/ASG-17 fire control system is used for aiming the rockets. Although the rockets are an air-to-air type, they can presently be used only for air-to-ground purposes with the F-100 because the sight system is not designed for air-to-air rocketry. Figure 1-29 shows rocket-firing order.

Rocket System Controls.

ARMAMENT SELECTOR SWITCH. This multiple-position switch (figure 1-15), in addition to its use with other armament systems, is used to select the rocket function desired.

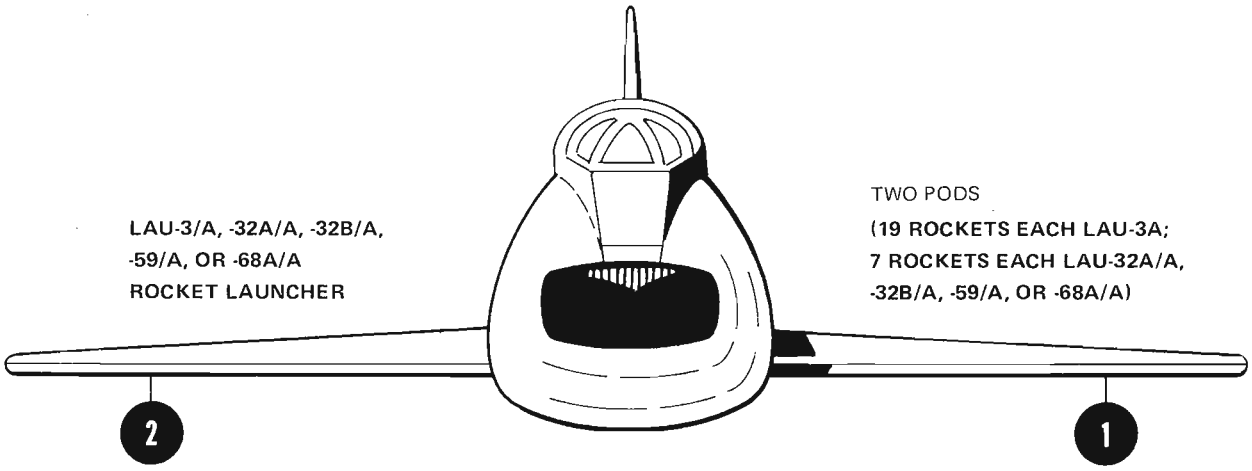


Figure 1-29. Rocket-Firing Order

With the armament selector switch at ROCKET-FIRE, and the rocket selector switch properly positioned, the rocket can be fired by pressing the bomb button. When the armament selector switch is at ROCKET-JETT, all launchers and adapters (pylons remain) force-jettison when the bomb button is pressed.

ROCKET INTERVALOMETER – AIRPLANES NOT CHANGED BY T.O. 1F-100D-632 or T.O. 1F-100-1069. The rocket-firing order between launchers is controlled by a rocket intervalometer. The intervalometer is in the fuselage and is powered by the secondary bus. When the armament selector switch is at ROCKET-FIRE and the rocket selector switch is at SINGLES, the total contents of one LAU-3/A, LAU-32A/A, LAU-32B/A, LAU-59/A, or LAU-68A/A launcher is fired each time the bomb button is pressed. With the armament selector switch at ROCKET-FIRE and the rocket selector switch at ALL, the intervalometer fires all rockets from both LAU-3/A, LAU-32A/A, LAU-32B/A, LAU-59/A, or LAU-68A/A launchers as long as the bomb button is held down. The intervalometer automatically maintains a fixed firing order with a 1/10-second delay between launchers. When any launcher fails to fire, the rocket intervalometer reset button should be used in a second attempt to fire the remaining rockets.

ROCKET SELECTOR SWITCH. The rocket selector switch (figure 1-15), on the armament control panel, provides a choice of rocket-firing operation and is powered by the secondary bus. With the armament selector switch at ROCKET-FIRE and the rocket selector switch at SINGLES, the contents of one LAU-3/A, LAU-32A/A, LAU-32B/A, LAU-59/A, or LAU-68A/A launcher is ripple fired each time the bomb button is pressed. When the bomb button is pressed again, the contents of the second launcher is fired. With the armament selector switch at ROCKET-FIRE, the rocket selector switch at ALL, and the bomb button pressed and held, the rocket intervalometer supplies 1/10-second delayed firing impulses between the launchers. Rockets continue firing in this manner until all are fired. Rocket firing between launchers may be interrupted by releasing the bomb button.

ROCKET SELECTOR SWITCH – AIRPLANES CHANGED BY T.O. 1F-100-1069. This rocket selector switch (figure 1-15) provides a choice of rocket firing from left hand outboard station only, right hand outboard station only, or both outboard stations simultaneously. With the armament selector switch at ROCKETS-FIRE and the rocket selector switch at LH, RH, or BOTH position, rockets will be single-fired or ripple-fired from the LAU-3 series, LAU-32 series, LAU-59 series, or LAU-68 series.

launcher selected, when the bomb button is pressed. Single or ripple firing from each launcher is preset with the selector inside the launcher before takeoff.

ROCKET INTERVALOMETER RESET BUTTON – AIRPLANES NOT CHANGED BY T.O. 1F-100-1069. The intervalometer reset button (figure 1-15) is powered by the secondary bus. When the button is pressed, it resets the rocket intervalometer. In addition to reindexing the rocket-firing circuits, the intervalometer reset button may also be used to reset circuits for further attempts to fire any misfired rockets. (During landing, the intervalometer is automatically reindexed to the starting position as the nose gear touches down.)

CBU DISPENSER SYSTEM. One CBU dispenser can be carried on a type III pylon at each outboard wing station. Release of the contents of the dispenser is selective, and the

dispensers can be jettisoned simultaneously by the bomb release and jettison systems. The system utilizes the existing chemical tank system circuitry.

NOTE

CBU series dispensers are designations for loaded SUU series dispensers. Cockpit controls labeled SUU-7/A apply to all of these CBU loading configurations. For ferry missions that require carrying an empty dispenser, a nose cone (plug) fairing can be installed in some SUU series dispensers to reduce frontal drag.

CBU Dispenser System Controls and Indicators.

ARMAMENT SELECTOR SWITCH. The armament selector switch (figure 1-15), in addition to its other functions, is used to set up the CBU release and jettison circuits. When the armament selector switch is at CHEM & SUU-7/A-RELEASE, a signal is applied to a selected dispenser with each depression of the bomb button. With the switch at CHEM & SUU-7/A-OUTBD JETT, both dispensers are jettisoned when the bomb button is pressed.

CHEMICAL TANK AND CBU SELECTOR SWITCH. The chemical tank and CBU selector switch (figure 1-15) is labeled CHEM & SUU-7/A. This switch provides for selection of the dispensers to be emptied by means of secondary bus power. When the armament selector switch is at CHEM & SUU-7/A-RELEASE, and the chemical tank and CBU selector switch is at OUTBD-RH, OUTBD-BOTH, or OUTBE-LH, a release signal is applied to a selected dispenser with each depression of the bomb button.

STATUS DISPLAY LIGHTS. Two status display lights (figure 1-26) read SUU-7/A EMPTY when on. One light is for the dispenser at the left outboard wing station; the other, the dispenser at the right outboard wing station. The lights come on to indicate that the intervalometer of the selected dispenser has cycled and the contents of that dispenser should have been released. The lights will go out only if the armament selector switch is moved to any position other than CHEM & SUU-7/A-RELEASE.

Chemical Tank System. A chemical tank can be carried on any wing pylon station. The release of chemicals from the tanks is selective, and the tanks can be jettisoned by the bomb release and jettison systems. However, the F-100C/D/F is not certified to carry chemical tanks.

External Store Release System. The external store release system releases stores at three different stations under each wing and on F-100D/F aircraft at one fuselage centerline station. The stores carried are high-explosive bombs, fire bombs, CBU dispensers, missiles, and rocket installations. The stores are suspended, at each ordnance station, from pylons. The detachable ejector-type pylon differs from the nonnuclear bomb rack in its method of releasing the load. The load, depending on the type carried, is forcibly ejected (wing stations) or is released and freefalls (centerline station). Two electrically ignited cartridges in the pylon jettison the load. Two separate and complete igniter circuits are provided – a normal and an emergency circuit – each terminating in igniter contacts in different cartridge cavities. When one cartridge is fired by either igniter circuit, the other is simultaneously fired by heat and pressure generated by explosion of the first cartridge. If the forward cartridge fails to fire because of a defective primer or a dead circuit, the rear cartridge is fired by the jettison circuits or auxiliary release circuits. The expanding gases, resulting from detonation of the cartridges, open both ejector rack hooks and force-eject stores from the pylon. The ejection force is applied directly to the support lugs of the load, this being the most heavily reinforced area. When rocket launchers, fire bombs, CBU dispensers, drop tanks, or other loads that are not readily separable from the airplane on release are carried, a valve in the pylon is held closed and the full force (high blow) of the exploding cartridges is applied to the load. When bombs are carried, a bypass valve is held open, allowing most of the ejection pressure to dump overboard (low blow) so that bombs are dropped in a manner closely approximating a freefall trajectory. The external load emergency jettison handle permits release and freefall of bombs (except fire bombs) which do not require force ejection. Pylons can be forcibly ejected from the F-100D/F airplane only when emergency jettison circuits are energized, and will not jettison until after all loads have been released. If, because of a faulty circuit, any load does not jettison from its pylon, both load and pylon jettison when the intervalometer jettisons the pylons. Pylons and loads are ejected at a 1/2-second delay between symmetrical pairs to reduce recoil loads on wing structure. The external store system is automatic in operation, once the armament switches, circuit breakers, and controls are set. For simplification, the external store electrical circuits are separated into the following five categories:

a. Normal release system.
b. External load emergency jettison button.
c. Armament selector switch – JETT ALL position.
d. External load emergency jettison handle.
e. External load auxiliary release buttons.

Normal Release System. Normal store release is determined by the position of the armament selector switch, except for the JETT ALL position. The bomb button, on the control stick and powered only when the airplane is airborne, initiates the release of all stores from the load stations by connecting power to the forward ejector cartridge in the rack manifold. The armament selector switch selects the type of store, load station, and release circuits to be connected to the bomb button. The mode selector permits the pilot to release bombs manually. The pylon loading switches complete the proper circuit to the release relays, and disconnect and bypass all other normal store release circuits. Fire bombs are released in pairs from opposite wing load stations. Rockets are ripple-fired in the SINGLES position from one LAU-3A, -32A/A, B/A, -59/A, or -68A/A launcher, or in the ALL position from all LAU-3A, -32A/A B/A, -59/A, or -68A/A launchers. All wing load stations have provisions for chemical spray operation. The outboard stations, utilizing the same circuit, have provisions for content release from the SUU-7A/A dispenser. All wing load stations have provisions for chemical tank release. CBU dispenser release from the outboard station is accomplished through the use of the same circuit. The tanks (or dispensers) are released in pairs from the opposite wing stations. The bomb arming switch selects the type of fuzing for high-explosive and fire bombs as they release. Either nose and tail arming, nose-only arming or tail-only arming is selected. In the SAFE position, bombs are released unarmed. A chemical and CBU selector selects the chemical tanks or CBU dispenser, permitting the contents to be emptied into the airstream.

External Load Emergency Jettison Button. External load emergency jettisoning of nonnuclear weapons is provided in the external store circuit. The external load emergency jettison button connects power to the rear ejection cartridges in the pylon and rack manifolds. With the exception that it will not operate on the ground, selecting the JETT ALL position with the armament selector switch and pressing the bomb button energizes the same circuit and produces identical results. These controls bypass the pylon loading switches and the electrical circuits pertaining to normal store release. The external load emergency jettison button connects power to jettison nonnuclear stores, in symmetrical pairs, then pylons on F-100D/F aircraft in symmetrical pairs, in proper sequence. (See Figure 1-28.) The bomb arming circuit is interrupted, and bombs and fire bombs, if carried, drop unarmed.

Armament Selector Switch – JETT ALL Position. This position releases all nonnuclear external stores (safe) (and pylons; F-100D/F) when the bomb button is pressed.

External Load Emergency Jettison Handle. In case of total electrical power failure, only stores that do not require full-power ejection, such as nonnuclear bombs, can be released to freefall unarmed by pulling the external load emergency jettison handle. Tank-type stores such as fire bombs, chemical tanks, rockets, and bomb dispensers cannot be manually released. They must be ejected with full power.

External Load Auxiliary Release Buttons. When the auxiliary release buttons – inboard, intermediate, and outboard – are pressed, the bomb arming circuit is not interrupted and the stores are released armed or unarmed, as selected by the arming switch.

WEAPONS SYSTEMS AND CONTROLS – AIRPLANES CHANGED BY T.O. 1F-100D-632.

Armament includes 20 mm guns and provisions for various external stores on jettisonable pylons under each wing and fuselage centerline. A triple ejector rack (TER) can be carried at each inboard station on a standard pylon. A programmer controller in the cockpit provides pulses to selected wing stations in accordance with store quantity, mode, and release interval selected. A gun-bomb-rocket sight is coupled with a radar ranging system for sighting. Gun strike, and documentation cameras record gun and missiles firing and bombing.

AN/ASG-17 Fire Control System. The system is unchanged by T.O. 1F-100D-632 (see page 1-12 this section.)

A-4 Sight. The function of the A-4 sight, and its controls, is unchanged by T.O. 1F-100D-632. However, some controls and indicators have been moved (see figure 1-30). Refer to "Weapon Systems and Controls – Airplanes Not Changed by T.O. 1F-100D-632".

CAMERA SYSTEM

Combat Documentation Cameras, Strike Camera, and Gun Camera. The Functions of these systems and their controls are unchanged by T.O. 1F-100D-632 with this exception: The gun-Missile switch replaces the Trigger Safety switch. SAFE on the Gun-Missile switch corresponds to CAMERA on the Trigger Safety switch, MISSILES corresponds to MISSILE CAMERA, and four gun positions correspond to GUNS CAMERA.

AIRPLANES CHANGED BY T.O. 1F-100D-632

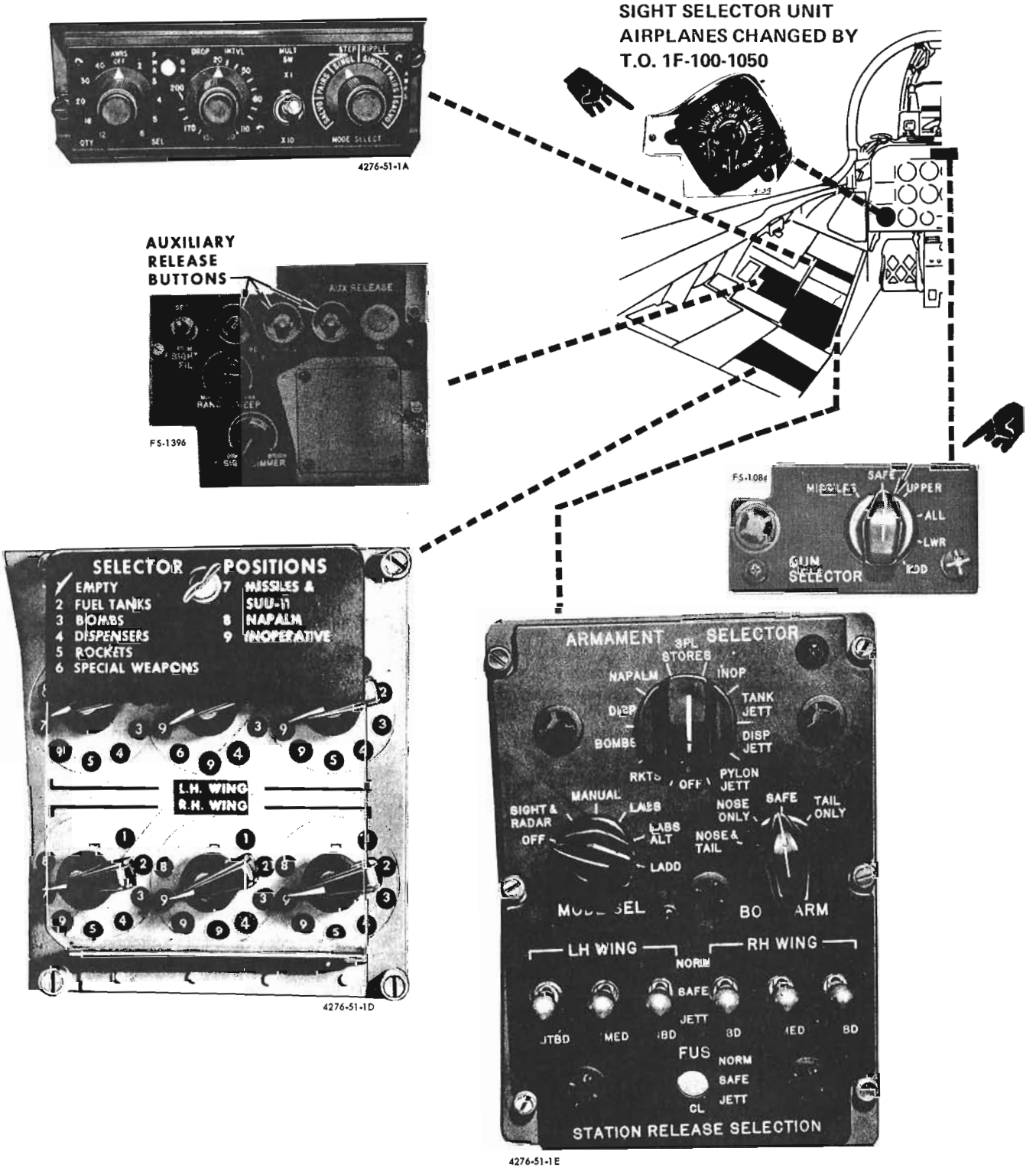


Figure 1-30. Pylon Loading Control and Armament Control Panels F-100 Typical

Gunnery System. This system is unchanged by T.O. 1F-100D-632 except as noted below. Refer to 'Weapon Systems and Controls – Airplanes not changed by T.O. 1F-100D-632'.

Gunnery System Controls.

GUN-MISSILE (GUN SELECTOR) SWITCH. Electrical power for operation of the missile and guns is controlled by secondary bus power through the gun-missile switch. (See figure 1-31.) The switch can be used for selecting the missile system, to permit the option of firing the two upper 20 mm guns in pairs, the two lower 20 mm guns in pairs, or all 20 mm guns simultaneously. With the switch at any position other than MISSILES or SAFE, power is applied to the sight and radar, and the radar will transmit if the Bomb Mode Selector is in MANUAL (not OFF). Turning the switch to MISSILES provides power for the missile system and the adjustable gun camera timer. Turning the switch to UPPER opens a fire control circuit to prevent operation of the lower guns. Turning the switch to LWR opens a fire control circuit to prevent operation of the upper guns. With the switch at ALL, the fire control circuit is completed to all fuselage-mounted guns. The POD position is not used, since the F-100 is not certified to carry a gun pod. Power to the gun-firing and missile circuits is disconnected with the gun-missile switch at SAFE. However, power is available to all cameras with the switch at any position.

NOTE

The gun- and missile-firing circuits are inoperative when the weight of the airplane is on the nose gear.

TRIGGER. The gun-firing, missile, and camera circuits are energized by the trigger (figure 1-17), which has two detent positions, and is powered by the secondary bus. With the gun-missile switch at UPPER, LWR, or ALL, the first detent of the trigger energizes the cameras and the 20 mm gun purge door selector valve so that utility hydraulic pressure can open the purge door for gun bay purging. At the second trigger detent, camera operation and gun bay purging continues, and high-voltage ac power is supplied from the gun-firing transformers to detonate the cartridges.

NOTE

If the purge door fails to open, thereby prohibiting the flow of air to the compartments requiring ventilation, a microswitch prevents gun-firing circuits from being energized.

As the second trigger detent is released, the guns stop firing and a time-delay unit in the purging system circuit keeps the purging system functioning for 5 seconds after the first trigger detent is released. With the gun-missile switch at SAFE, only the cameras will be actuated by either detent of the trigger. Missiles are fired with the trigger pressed to the second detent when the gun-missile switch is at MISSILES, and the additional required switches are properly positioned.

GROUND FIRE SWITCH. Operation is unchanged by T.O. 1F-100D-632.

AIM-9B/E/J Missile System. The AIM-9B/E/J missile system is unchanged by T.O. 1F-100D-632, with the exception of installation of new status display lights. For information on the missile system, and its controls, refer to 'Weapon Systems and Controls – Airplanes Not Changed by T.O. 1F-100D-632'.

STATUS DISPLAY LIGHTS. Four green status display lights (see figure 1-32) are for AIM-9 missiles. Function and light sequence/launch order are unchanged. The lights are powered by the secondary bus, and can be tested by the indicator light circuit.

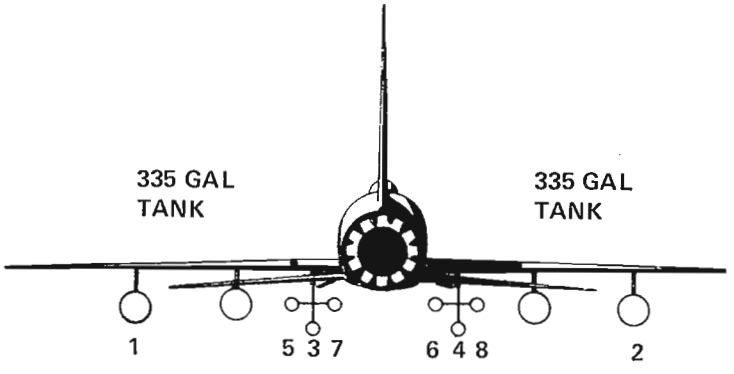
Ordnance System. Six stations for mounting various combinations of stores are on the lower surface of the wing. Stores also can be carried at a fuselage centerline station. A triple ejector rack (TER) can be carried at each inboard wing station. Wing station stores can be operated singly, in pairs, and salvo, in a step or ripple mode, depending upon settings of the armament selector switch, station selector switches, and the aircraft weapon release system programmer controller in the cockpit. The programmer controller can be bypassed for operation of stores through the basic airplane circuitry. (Figure 1-31.)

TER-EMPTY LIGHTS. Two amber placard-type lights (figure 1-32) labeled TER EMPTY LH and TER EMPTY RH, come on to indicate that all bomb racks in the respective TER are empty, if the armament selector switch is at any position other than OFF or RKTS. The lights are powered by the primary bus. Bulbs in the lights can be lested by the indicator light test circuit when the armament selector switch is at OFF or INOP position.

EXTERNAL LOAD RELEASE SEQUENCE

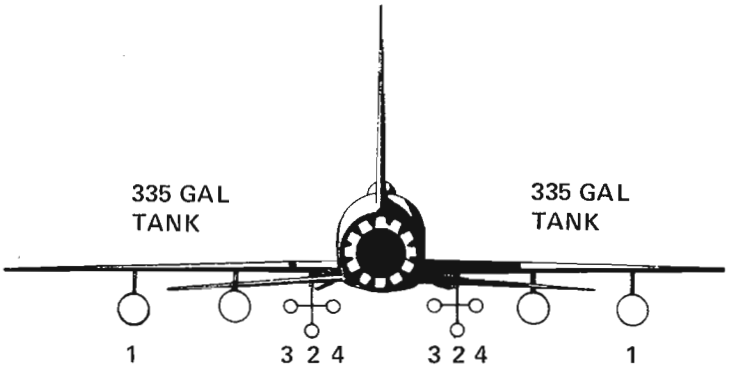
WITH SINGLE DEPRESSIONS OF BOMB BUTTON

STEP SINGLE



TYPICAL COMBAT CONFIGURATION: FINAL MODIFICATION.

STEP PAIRS



(WITH BOMB BUTTON DEPRESSED AND HELD.)
RIPPLE SINGLE WITH 8 ON AWRS QUANTITY SWITCH.

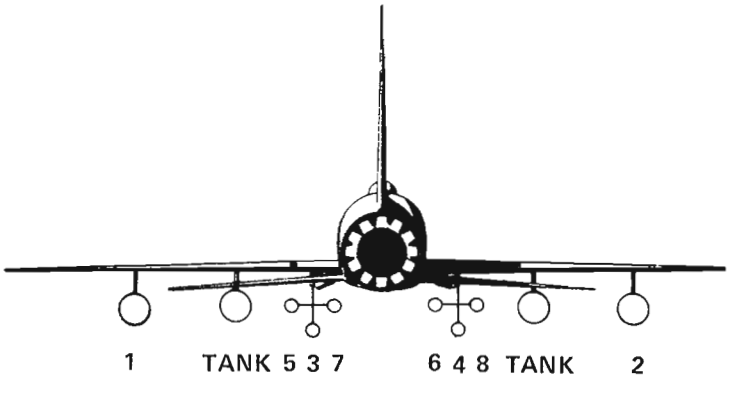
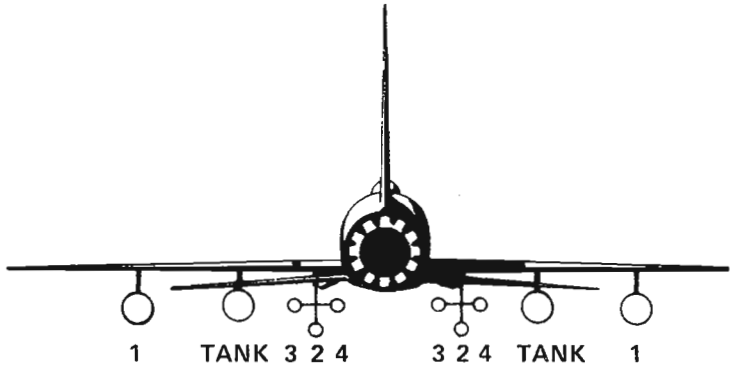
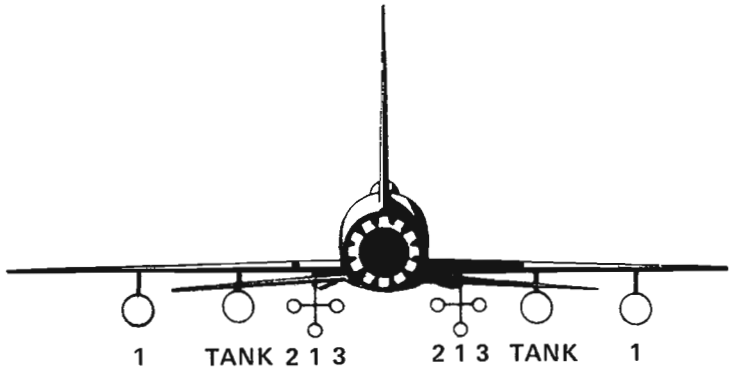


Figure 1-31 (Sheet 1 of 2)

RIPPLE PAIRS WITH 4 ON AWRS QUANTITY SWITCH



RIPPLE SALVO WITH 3 ON AWRS QUANTITY SWITCH.



STEP SALVO

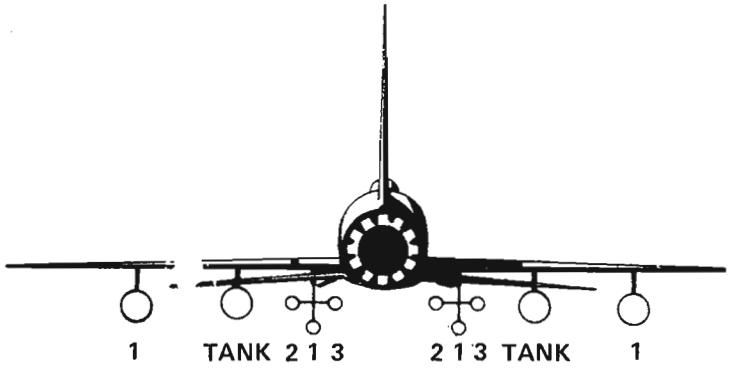


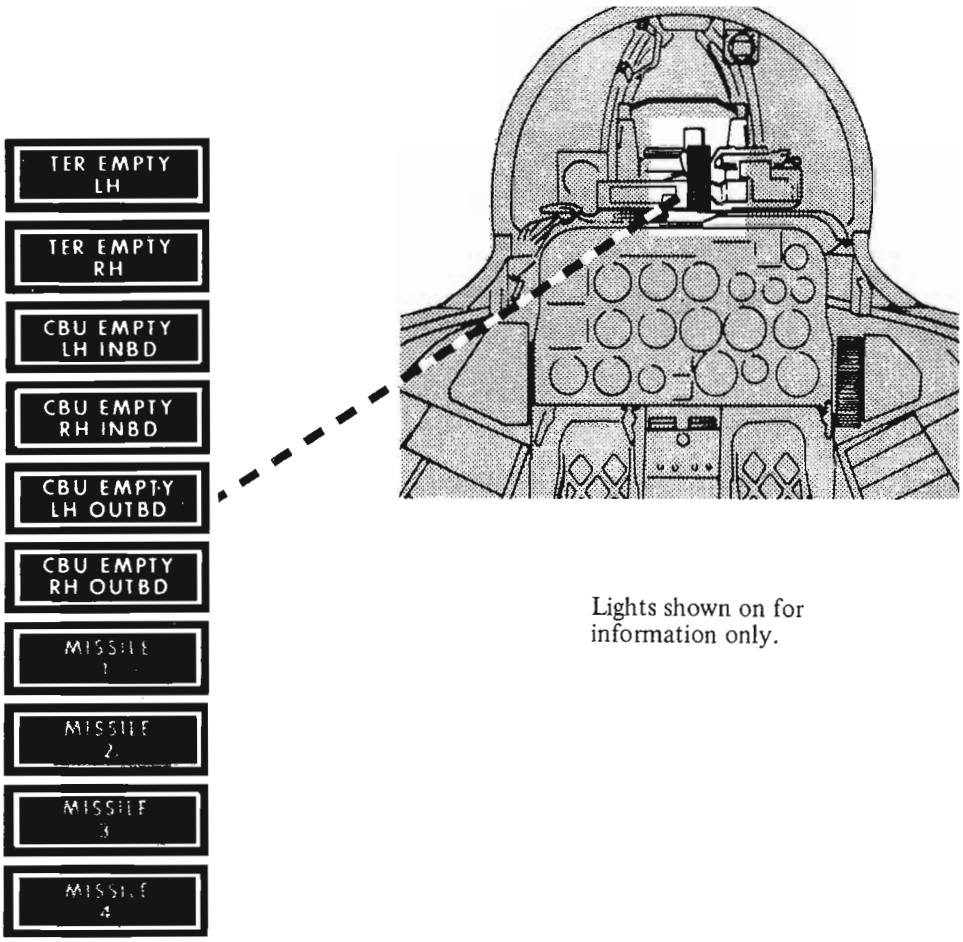
Figure 1-31 (Sheet 2 of 2)

BOMBS. The airplane can carry a variety of stores at the six wing store stations, and on a TER at each inboard wing station. Stores can be dropped manually, or automatically at various intervals, quantity, and modes, through the aircraft weapon release system programmer controller. The bomb button is used for releasing stores. All cameras operate automatically when bombs are released.

ROCKETS. The airplane can carry two LAU-3/A, -32A/A, B/A, -59/A, or -68A/A rocket launchers, one on each outboard wing station. The launchers can be attached directly to pylons without the use of adapters. Each type launcher contains 2.75-inch FFA rockets: the LAU-3/A, 19; the LAU-32A/A, B/A, -59/A, and -68A/A, each contain 7.

Although the rockets are an air-to-air type, they can presently be used only for air-to-ground purposes because the sight system is not designed for air-to-air functions. The A-4 sight is used for aiming the rockets, and the bomb button is used for firing the rockets.

CBU DISPENSERS. Several types of CBU dispensers can be carried, one at each outboard wing station on a type IIK series pylon, and up to three on a TER at each inboard wing station. Selective release of dispenser contents can be performed manually, or automatically at various intervals. quantity, and mode through the aircraft weapon release system programmer controller. The bomb button is used for releasing the contents of the dispensers.



Lights shown on for information only.

Figure 1-32. Status Display Lights

CBU-EMPTY LIGHTS. Four amber placard-type lights (figure 1-32) are for indicating a CBU-empty condition. The lights come on to indicate that the intervalometer of the selected dispenser has cycled and its contents should have been released. The lights will go out only if the armament selector switch is moved to any position other than DISP. The lights are powered by the primary bus. Bulbs in the lights can be tested by the indicator light test circuit when the armament selector switch is at OFF or INOP position.

AN/AWE-1 Aircraft Weapon Release System (AWRS). The AWRS provides selectable store quantity, mode, and various intervals for weapon release and firing to the six wing store stations. The system has provisions only for release or operation of a nonnuclear weapon at the fuselage centerline station. The special store cannot be released through the AWRS. The system is actuated through the bomb button to send release signals to stations carrying such stores as selected on the armament selector switch and the station selector switches. A controller in the cockpit contains the necessary switches for making pertinent drop selections. A programmer in the fuselage equipment bay contains electronic circuitry that generates release signals under command from the controller. The AWRS is powered by the primary bus and the main 3-phase ac bus.

NOTE

On airplanes changed by T.O. 1F-100D-632D, if the programmer has been removed, the airplane's basic armament system circuitry can be used for operation of conventional external ordnance, provided the wiring harnesses which normally plug into the programmer are plugged into a bypass adapter.

Ordnance System Controls and Indicator. The function and operation of the following ordnance system controls (see figure 1-30) is unchanged by T.O. 1F-100D-632:

Pylon Loading Selector Switches
Bomb Arming Switch
External Load Auxiliary Release Buttons
External Load Emergency Jettison Button
External Load Emergency Jettison Handle
Special Store Unlock Handle

For information on these controls, refer to 'Weapon Systems and Controls – Airplanes Not Changed by T.O. 1F-100D-632'.

The airplane has provisions only for a fuselage centerline station pylon loading selector switch.

STATION SELECTOR (STATION RELEASE SELECTION) SWITCHES. Six station selector switches (figure 1-30), one for each wing station, control operation of stores and jettison of pylons selected by the armament selector switch. The airplane has provisions only for a station selector switch for the fuselage centerline store. Moving a station selector switch from SAFE to NORM and pressing the bomb button or trigger operates the store(s) from the wing station or stations represented by the switch selected. The NORM position is also used to selectively jettison the drop tanks, CBU dispensers, and rocket launchers. With a selector switch at JETT (the switch toggle shall be pulled to obtain this position) and the armament selector switch at PYLON JETT, pressing the bomb button jettisons the pylon (stores installed go with pylons) from the stations selected. The position of the station selector switches does not affect the AWRS programmer controller – it affects the store release signal only. For example, if the left intermediate wing station selector switch is at SAFE, and the AWRS release mode switch is at RIPPLE-PAIRS, the programmer will send a signal to both intermediate wing stations but only the right intermediate wing station will be operated. Missile-firing circuits are not affected by the station selector switches. The station selector switches are powered by the secondary bus.

ARMAMENT SELECTOR SWITCH. This rotary switch (figure 1-30), powered by the secondary bus, selects external ordnance for operation, or drop tanks and pylons for jettison. Moving the switch from OFF to RKTS, BOMBS, DISP, or NAPALM, and pressing the bomb button fires rockets, drops bombs, dispenses CBU bomblets, and drops fire bombs from wing stations selected by the NORM position on the station selector switches. When the armament selector switch is at TANK JETT and the bomb button is pressed, the drop tanks are jettisoned from the wing stations selected by the NORM position of the station selector switches. With the armament selector switch at DISP JETT and the AWRS quantity selector switch at OFF, pressing the bomb button jettisons the CBU dispensers and rocket launchers from wing stations selected by the NORM position on the station selector switches. Pylons are retained. With the armament selector switch at PYLON JETT, pressing the bomb button jettisons pylons from wing stations selected by the JETT position on the station selector switches. (Stores installed go with pylons.) All armament selector switch positions except SPL STORES, TANK JETT, and PYLON JETT are wired through the AWRS programmer controller.

WARNING

When rocket launchers containing rockets are jettisoned in the dispenser jettison mode, the aircraft must be headed away from friendly areas. In the dispenser jettison mode, the normal rocket fire signal is received at the launcher simultaneously with the jettison signal, thus launching one or more rockets.

BOMB RELEASE MODE SELECTOR SWITCH. A selector switch (figure 1-30) is used for selecting the mode of bomb release desired, and controlling operation of the radar range system and the A-4 sight. When the switch is at any position other than OFF, power is applied to the sight. When the switch is at SIGHT & RADAR, power also is supplied to the radar ranging system. When the selector switch is at MANUAL (armament selector switch at BOMBS and station selector and AWRS controller switches properly set), bombs are released by the bomb button. With the switch at LABS, bombs are released at an automatically computed point on the bomb run. With the switch at LABS ALT, bombs are released at an automatically computed alternate point on the bomb run. The LADD position is used in the low-altitude drogue delivery system. Power to all units of the fire control system is disconnected when the switch is at OFF. The bomb release mode selector switch is powered by the primary bus.

BOMB BUTTON. Store release, and drop tank and dispenser jettison circuits are energized by primary bus power when the bomb button (figure 1-17) is pressed. All camera circuits are also energized when the bomb button is pressed. One release signal is generated with each depression of the button. The button must be held down when releasing stores or firing rockets during the various ripple modes using the AWRS programmer controller. The bomb button is also used to jettison pylons.

WARNING

Before pressing the bomb button, make sure the armament selector switch, bomb release mode selector switch, the AWRS programmer controller, and the station selector switches are properly positioned for the desired release or jettison function. Failure to check switch positions could cause accidental bomb or rocket release, or failure of desired load to release.

EXTERNAL LOAD AUXILIARY RELEASE BUTTONS. The functions of these buttons is unchanged by T.O. 1F-100D-632.

WARNING

When TERS are carried on inboard pylons, pressing the INBD button jettisons the TERS from the pylons.

AWRS QUANTITY SELECTOR SWITCH. With the quantity selector switch (figure 1-30) at OFF, electrical power is removed from all switches on the aircraft weapon release system controller, and from the programmer. Turning the switch to any numbered position energizes the AWRS and provides for the quantity (number of release pulses) of the type store selected, for operation in a RIPPLE – SINGLE or a RIPPLE – PAIRS mode, in accordance with a predetermined station priority. In any step release mode, the switch can be turned to any position other than OFF.

AWRS POWER-ON LIGHT. The green power-on light (figure 1-30) comes on when the quantity selector switch is at any numbered position, to indicate the AWRS is energized.

AWRS RELEASE INTERVAL SWITCH. Marked with a linear scale of from 20 through 200 in milliseconds, this switch (figure 1-30) controls store time release interval in all ripple modes. The release interval switch is used in conjunction with a multiplier switch to increase release interval. When carrying TER's, the switch should be set at a minimum of 60 milliseconds to allow sufficient time for cocking the sequencing switch within the TER bomb rack.

AWRS MULTIPLIER SWITCH. Moving the multiplier switch (figure 1-30) from XI to XIO increases the time release interval in milliseconds set on the release interval switch from 20 through 200, to 200 through 2,000.

AWRS MODE SELECT SWITCH. The mode select switch (figure 1-30) provides selection for the following release or firing modes: STEP – SINGL, – PAIRS, – SALVO, RIPPLE – SINGL, – PAIRS, – SALVO. When the switch is at any of the three step modes, the AWRS quantity selector, release interval, and multiplier switch circuits are locked out, and each depression of the bomb button applies one release or fire pulse. With the switch at RIPPLE – SINGL or RIPPLE – PAIRS, pressing and holding the bomb button applies a train of release or fire pulses. With the switch at STEP – SALVO or RIPPLE – SALVO, pressing the bomb button applies one release signal simultaneously to all stations. If all three racks of a TER are loaded, three release signals are required to release the three stores on that TER.

Operation of AN/AWE-1 Aircraft Weapons Release System (AWRS).

STATION AND TER PRIORITY. To insure that airplane stability and control are maintained, the AWRS generates signals for release, firing, or dispensing of ordnance according to a predetermined station priority, except in salvo modes, as follows:

PRIORITY	WING STATION
1	Outboard
2	Intermediate
3	Inboard

In salvo modes, release is simultaneous from all stations. TER's retain their individual priority.

When ordnance is carried on TER's at the inboard wing stations, the priority for these stores is further broken, as follows:

PRIORITY	TER
1	Center (lower) rack
2	Left rack
3	Right rack

Each TER bomb requires 60 milliseconds between release impulses.

Priority operation of ordnance will result in the ordnance at the highest priority station being operated first. For example, if release of bombs is planned and they are carried only at the intermediate and inboard wing stations, the first bombs to be released will be those at the intermediate stations, since the outboard stations, in this example, are empty or have something other than bombs installed. On airplanes not changed by T.O. 1F-100D-632D, in the STEP – SINGL mode, the outboard wing stations have equal priority during bomb and fire bomb release and drop tank jettison. On airplanes changed by T.O. 1F-100D-632D, in the STEP – SINGL mode, the left outboard wing station has priority over the right outboard wing station during bomb and fire bomb release and drop tank jettison. On all airplanes, the left outboard wing station has priority over the right outboard wing station during rocket firing and dispensing of CBU bomblets. In the STEP – SINGL mode, the left intermediate and left inboard stations normally have priority over their respective right wing stations. In STEP – PAIRS, each left wing station shares equal priority with the opposite station on the right wing. In STEP – SALVO, the selected ordnance is operated simultaneously from all stations. However, the TER's retain their individual rack priority. On airplanes not changed by T.O. 1F-100D-632D, in the RIPPLE – SINGL mode, the outboard wing stations have equal priority during bomb and fire bomb release and drop tank jettison. On airplanes changed by T.O. 1F-100D-632D, in the RIPPLE – SINGLE mode, the left outboard wing station has priority over the right outboard wing station during bomb and fire bomb release and drop tank jettison. On all airplanes, the left outboard wing station has priority over the right outboard wing station during rocket firing and dispensing of CBU bomblets.

In the RIPPLE – SINGL mode, the left intermediate and left inboard wing stations have priority over their respective right wing stations. In RIPPLE – PAIRS, each left wing station shares equal priority with the opposite station on the right wing. In RIPPLE – SALVO, the selected ordnance is operated simultaneously from all stations. However, the TER's retain their individual rack priority.

NOTE

When the external load emergency jettison button is pressed, the AWRS is bypassed, and all external stores, then pylons are jettisoned.

In a RIPPLE – SINGL or RIPPLE – PAIRS mode, if the bomb button should be released before all loads selected are released, the ripple cycle will be interrupted. If the bomb button is pressed again, the cycle will start again and the same number of stores previously selected will be released, but from the next higher priority stations.

RELEASE MODES. See figures 1-31, 1-33 and 1-34 for stores operating sequences in the various modes.

NOTE

If rocket launchers are carried at the outboard and inboard wing stations, none of the programmer controller SINGLES or PAIRS modes are effective for firing the rockets at the inboard stations. This is because empty signals cannot be generated through the rocket launchers and, consequently, the airplane station transfer control circuits cannot be energized to permit the programmer to step to the inboard stations. Therefore, it is recommended that, regardless of the total number of launchers installed, the rockets be fired manually by use of the airplane basic armament control circuitry (AWRS quantity selector switch OFF and selecting the related station selector switches) or with the programmer controller in STEP – SALVO or RIPPLE – SALVO modes.

STEP SINGLE. With each depression of the bomb button, a single release signal is directed to the highest priority station in accordance with the store type selected on the armament selector switch. If a station of the next highest priority is empty or is loaded with something other than the type store selected for release, the release pulse will be continually directed down the line to the next highest priority station (of store type selected) until all stations are depleted.

STEP PAIRS. With each depression of the bomb button, a simultaneous release signal is directed to both highest priority stations in accordance with the store type selected on the armament selector switch. In this mode, if equal priority pairs are in asymmetrical configuration (i.e., bomb at left outboard station and rockets at right outboard station) or if one of the equal priority pairs is missing (empty station), neither weapon will release. The programmer will then direct release signals to the highest priority pairs.

STEP SALVO. There is no regard to station priority in this mode. With one depression of the bomb button, a simultaneous release signal is directed to each wing station carrying a store of the type selected on the armament selector switch. If a fully loaded TER is carried at each inboard wing station, the bomb button shall be pressed twice more to clean the TER.

RIPPLE SINGLE. When the bomb button is pressed and held, a train of pulses is directed to single stations carrying stores selected on the armament selector switch. The pulses will continue in priority sequence until all stations selected are emptied, in accordance with the setting of the quantity selector switch.

RIPPLE PAIRS. When the bomb button is pressed and held, a train of pulses is directed to pairs of highest priority stations carrying loads selected on the armament selector switch. Pulses continue in pairs in priority sequence until the number of stations selected for release are empty. The system will then stop generating release signals. In this mode, if equal priority pairs are in asymmetrical configuration (i.e., bomb at left outboard station and rockets at right outboard station) or if one of the equal priority pairs is missing (empty station), neither weapon will release. The programmer will then direct release signals to the next highest priority pairs.

RIPPLE SALVO. There is no regard to station priority in this mode. With one depression of the bomb button, a simultaneous release signal is directed to each wing station carrying a store type selected on the armament selector switch. However, since racks on a TER retain individual priority, the quantity selector switch shall be properly positioned to release all stores from TER's.

CONTROL-LER MODE	SEQUENCE	REMARKS
STEP-SINGLES	For each depression of the bomb button, one release pulse is applied to a selected station. AIRPLANES CHANGED BY T.O. 1F-100D-632D Release pulses are applied in a normal left-right outboard to inboard priority. AIRPLANES NOT CHANGED BY T.O. 1F-100D-632D No bombs outboard: Release pulses applied in normal left-right intermediate to inboard priority. Bombs outboard: Priority for next pair of priority stations is right-left.	For airplanes not changed by T.O. 1F-100D-632D, bombs at the outboard stations are released simultaneously. If more than one bomb is installed on a TER, only one bomb will release from the TER for each release pulse applied to that station.
STEP-PAIRS	For each depression of the bomb button, one release pulse is applied simultaneously to the selected pair of priority stations. The release pulses are applied in an outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a bomb, that bomb will not release. The programmer will step to the next pair of equal priority stations. If more than one bomb is installed on a TER, only one bomb will release from each TER for each release pulse applied to those stations.
STEP-SALVO	For each depression of the bomb button, one release pulse is applied simultaneously to all selected stations	If more than one bomb is installed on a TER, only one bomb will release from each TER for each release pulse applied to those stations.
RIPPLE-SINGLES	For each depression of the bomb button, the number of release pulses selected are applied in train to the selected stations. AIRPLANES CHANGED BY T.O. 1F-100D-632D Release pulses are applied in a normal left-right outboard to inboard priority. AIRPLANES NOT CHANGED BY T.O. 1F-100D-632D No bombs outboard: Release pulses applied in normal left-right intermediate to inboard priority. Bombs outboard: Priority for next pair of priority stations is right-left.	Bombs at the outboard stations are released simultaneously. If more than one bomb is installed on a TER, each pulse of the train of release pulses to that station will release one bomb. For aircraft modified by T.O. 1F-100D-632, the minimum intervalometer setting for high drag RIPPLE SINGLES, release will be 100 milliseconds.
RIPPLE-PAIRS	For each depression of the bomb button, the number of release pulses selected are applied in train to the selected pairs of priority stations. The train of release pulses are applied in an outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a bomb, that bomb will not release. The programmer will step to the next pair of equal priority stations. If more than one bomb is mounted on a TER, each pulse of the train of release pulses to each TER will release one bomb.
RIPPLE-SALVO	For each depression of the bomb button, the number of release pulses selected are applied in train simultaneously to all selected stations	If more than one bomb is installed on a TER, each pulse of the train of release pulses to that station will release one bomb.

NOTE

In the event a "hung-bomb" condition occurs, due to failure of the release signal to energize the release relays, the AWRS programmer will not step to the succeeding station, and the remaining stores must be released manually. When a "hung-bomb" condition is caused by a failure of a cartridge to properly fire or by a mechanical failure within the release rack, the AWRS programmer will step past the hung-bomb station to the succeeding station. When the hung bomb is on a TER, the associated TER EMPTY light will not come on.

Figure 1-33. Stores Operating Sequence Using AWRS Bombs, Fire Bombs, Leaflet Bombs, Land Mines, and CBU-24( ), -29( ), -49( ), -52( ), -53/B, -54/B, -58/B, and CBU-71/B Dispensers.

CONTROL-LER MODE	SEQUENCE	REMARKS
STEP-SINGLES	For each depression of the bomb button, one dispensing pulse is applied to a selected station. The dispensing pulses are applied in the normal left-right, outboard to inboard priority.	If dispensers are installed on the same station on both wings, the programmer will step back and forth between these stations for each dispensing pulse applied, until both dispensers are empty. Then the programmer will transfer to the next pair of stations.
STEP-PAIRS	For each depression of the bomb button, one dispensing pulse is applied simultaneously to the selected pair of priority stations. The dispensing pulses are applied in the normal outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a dispenser, that dispenser will not operate. The programmer will step to the next pair of equal priority stations. If dispensers are installed at more than one priority pair of stations, the programmer will not step to the next priority pair of stations until the dispensers on the higher priority pair of stations have been emptied.
STEP-SALVO	For each depression of the bomb button, one dispensing pulse is applied simultaneously to all selected stations.	For those dispensers which have selective tube release capability, each successive depression of the bomb button will cause additional tubes to dispense, until all the dispensers are empty.
RIPPLE-SINGLES	For each depression of the bomb button, the number of dispensing pulses selected are applied in train to the selected stations. The dispensing pulses are applied in the normal left-right, outboard to inboard priority.	For those dispensers which have selective tube release capability, the programmer will step from left to right on equal priority stations, but will not step to a lower priority station until the dispenser on the higher priority station has been emptied.
RIPPLE-PAIRS	For each depression of the bomb button, the number of dispensing pulses selected are applied in train to the selected pairs of priority stations. The train of dispensing pulses are applied in an outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a dispenser, that dispenser will not operate. The programmer will step to the next pair of equal priority stations. For those dispensers which have selective tube release capability, the programmer will not step to the next priority pair of stations until the dispensers on the higher priority pair of stations have been emptied.
RIPPLE-SALVO	For each depression of the bomb button, the number of dispensing pulses selected are applied in train simultaneously to all selected stations	If the first depression of the bomb button does not dispense from all tubes of those dispensers which have selective tube release capability, succeeding depressions of the bomb button will cause dispensing from additional tubes until the dispensers are empty.

NOTE

If a dispenser at an outboard station fails to operate, the AWRS will continue to apply succeeding pulses to that station and will not step to the next priority station. Dispensers at other stations must be operated manually.

If a dispenser installed on a TER fails to dispense, the CBU empty light for the TER rack involved will not come on.

Figure 1-34. Stores Operating Sequence Using AWRS CBU Dispensers – Except CBU-24( ), CBU-29( ), CBU-49( ), CBU-52( ), CBU-53/B, and CBU-54/B

WEAPON SUSPENSION SYSTEMS.

Pylons.

TYPE I SERIES, F-100C AIRPLANES. The Type I pylon is a streamlined metal enclosure, contoured to be installed at the inboard wing station 55 on F-100C airplanes. The basic features of the pylon are shown in figure 1-35. The pylon is bolted to the airplane wing through two fittings in the upper portion of the pylon. The pylon is stabilized by a sway strut. One end of the strut is attached to the inboard side of the pylon, and the other end is attached to fittings on the airplane fuselage structure.

The pylon consists of the fairing assembly, ejector rack assembly, external fuel tank equipment, mechanical linkage, and an electrical harness assembly. The pylon permits carriage of conventional bomb-type munitions or an external fuel drop tank. On pylons not modified by T.O. 11B81-2-534, this valve is automatically positioned by an actuating rod. When a tank is loaded it pushes up on this rod, causing the mechanical linkage within the pylon to select full-power (hi-blow) ejection. When a bomb-type store is loaded the rod is allowed to remain down for partial-power (lo-blow) ejection. On pylons modified by T.O. 11B81-2-534, this selection is made manually during loading, independent of the shape of the store. The internal linkage of all type I series pylons is designed such that manual release of stores is possible only when the slide valve mechanism is selected to the partial-power (lo-blow) position. Four sway-brace studs, two on each side of the pylon, prevent lateral movement of a store after it is loaded.

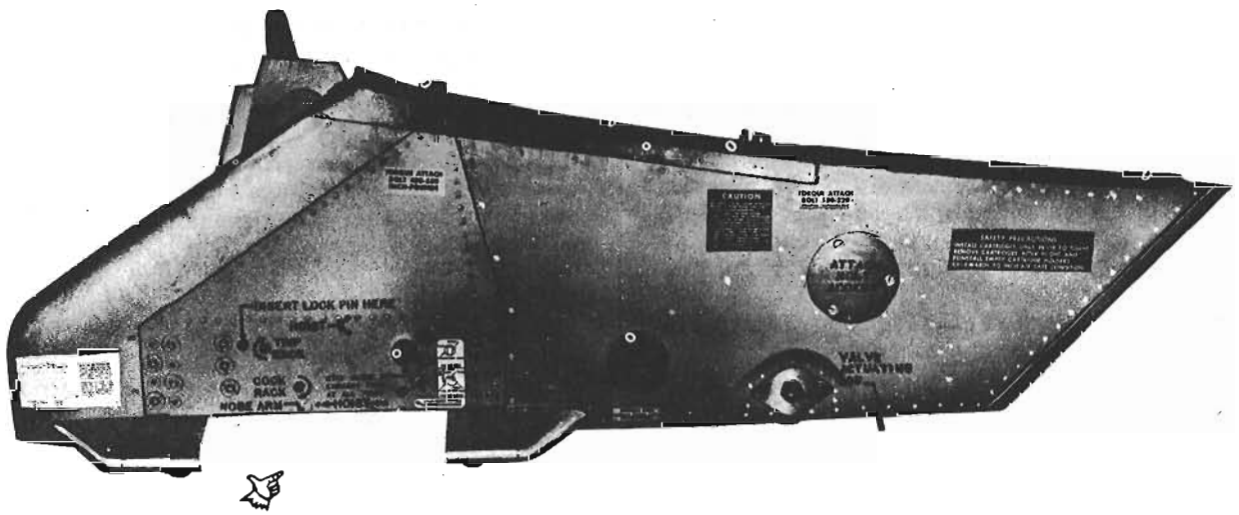


Figure 1-35. Type I Pylon, F-100C (Typical)

TYPE IB SERIES, F-100 D/F AIRPLANES. The Type IB pylon (figure 1-36) incorporates all modifications and/or improvements accomplished on other Type I series pylons. It can be recognized by its lack of sheet metal fairings between the sway-brace studs, by its lack of the pylon actuator strut, and by its redesigned one-piece cartridge retainers. The Type IB pylon has TER (triple ejector rack) capabilities.

TYPE I SERIES, F-100 D/F AIRPLANES. The Type I pylon (figure 1-37) is a streamlined metal enclosure, contoured to be installed at inboard wing station 55. The pylon is attached to the airplane wing by inserting the pylon support post into the wing station cylinder sleeve and mating and tightening the pylon attach hooks to the wing station attach fittings. This pylon is provided with jettisoning features which permit the pylon to be ejected during flight. Power required to eject the pylon from the airplane is obtained from the combined explosive charges of two removable, electrically fired cartridges which are installed in the pylon. These charges are ignited by the airplane armament circuitry. Whenever cartridges are fired, the expanding gases are ducted to the pylon support post inner piston frangible link. The frangible link breaks and the pylon attach hooks are forced open. The gas pressures in the pylon support post then push the pylon away from the airplane wing. The pylon structure contains necessary plumbing and fittings for installation of auxiliary fuel tanks, electrical wiring provisions for connection of stores and/or munitions, and ejector rack assembly.

The ejector rack is a separately contained unit installed as a complete assembly in the pylon. The rack is constructed with 14-inch hook spacing to carry and release stores or munitions with 14-inch suspension-lug spacing. The stores or munitions may be forcibly ejected from the rack hooks or released to fall of their own weight. Power to eject the store or munition cartridges in the rack. These cartridges are ignited by the airplane armament circuitry. Whenever cartridges are fired, expanding gasses are channeled through a manifold to the ejector pistons and the rack unlocking piston. The ejector rack mechanism is designed so that the unlocking piston releases the rack hooks and the ejector pistons force the store or munition away from the rack simultaneously. Service racks have been modified with a gas ejector piston return system. The ejector pistons remain extended after store release. The rack manifold has a two-position, sliding metering valve. On pylons earlier than type IB not modified by T.O. 11B81-2-530, this valve is automatically positioned by an actuating strut. When a tank or tank-sized store is loaded it pushes up on this strut, causing the mechanical linkage within the pylon to select full-power (hi-blow) ejection. When a bomb-type store is loaded, the strut is allowed to remain down for partial-power (lo-blow) ejection. On type IB and earlier type I pylons modified by T.O. 11B81-2-530, this selection is made manually during loading, independent of the shape of the store. The internal linkage of all type I series pylons is designed such that manual release of stores is possible only when the slide valve mechanism is selected to the partial-power (lo-blow) position.

If a bomb is installed, the bomb surface does not contact the valve actuator arm and it remains in its spring-loaded downward position. The pylon slide valve in the ejector rack remains open under this condition, allows a portion of the gas to escape, and results in a partial-power ejection of the store.

Mechanical linkage in the rack, for manual release of the stores or munitions from the cockpit, becomes inoperative whenever the pylon slide valve is positioned for full-power (high-blow) ejection. A rack release mechanism is also provided at the pylon to facilitate removal of stores or munitions. Two horizontally opposed arming solenoids provide for nose and tail, or tail-only, arming of the bomb fuzes. The bomb may also be released with fuzes unarmed. As viewed looking forward, the nose arming solenoid is on the left side of the rack, and the tail arming solenoid is on the right side.

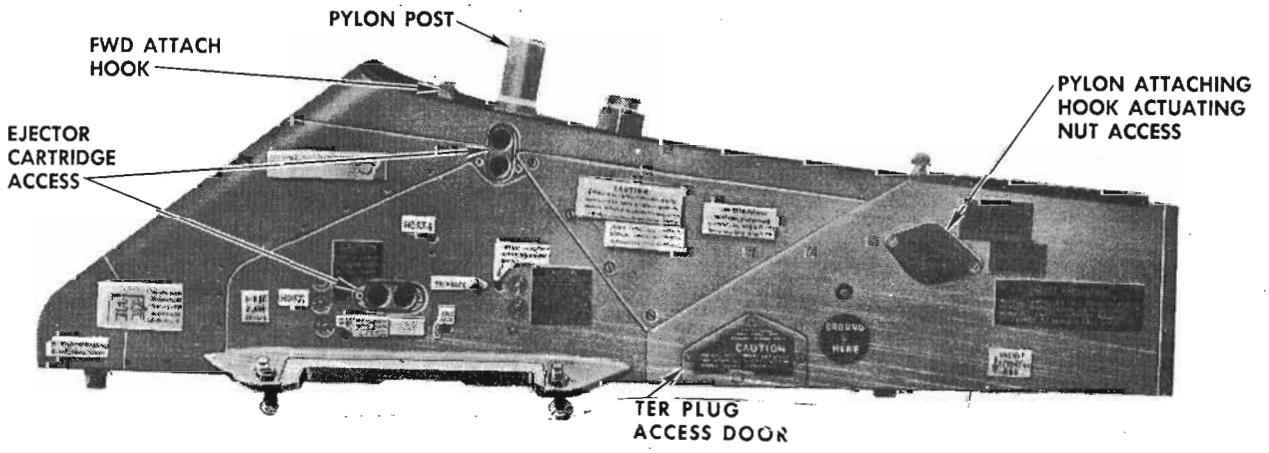
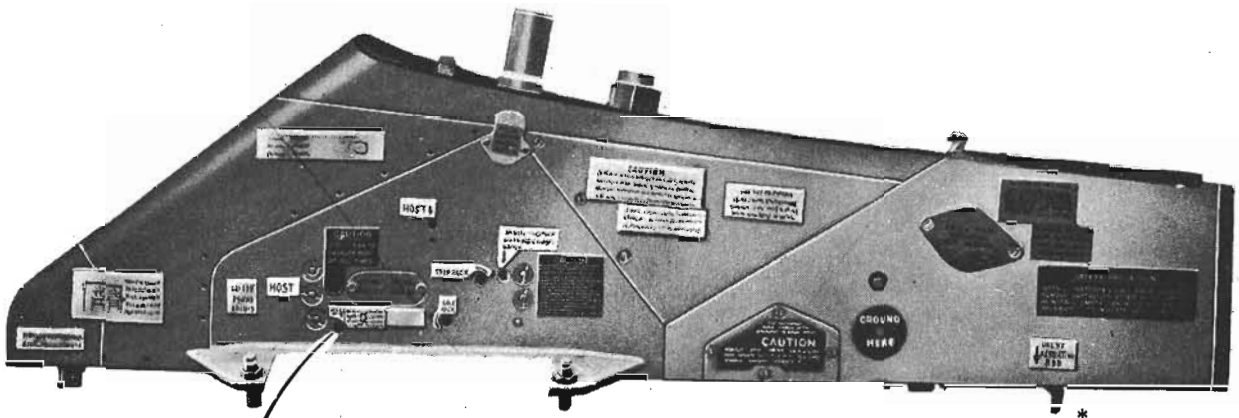
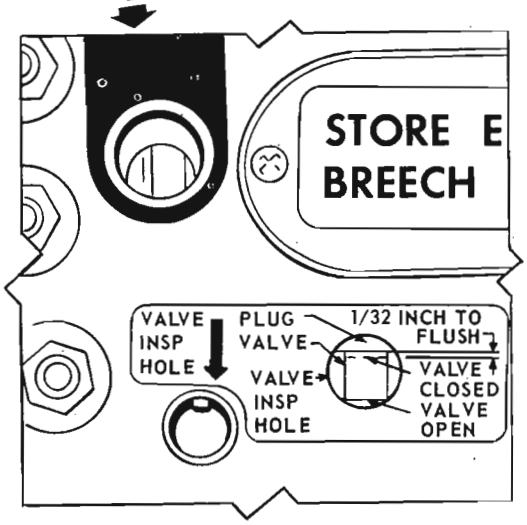
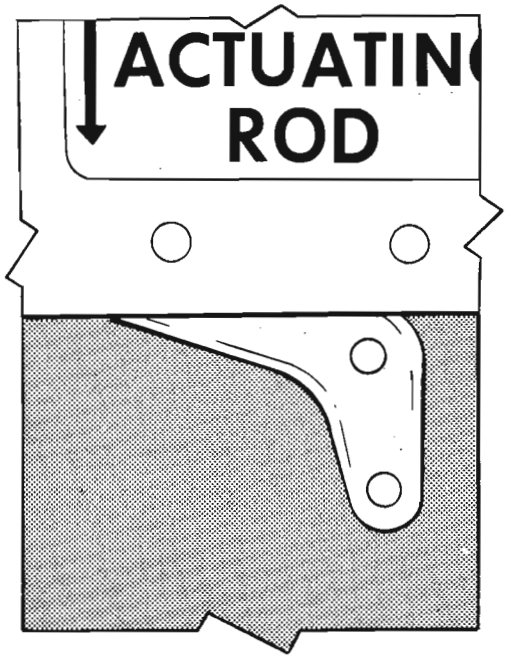


Figure 1-36. Type I Series Pylon (F-100D/F Aircraft)





VALVE INSPECTION HOLE CLEAR
(HIGH BLOW)



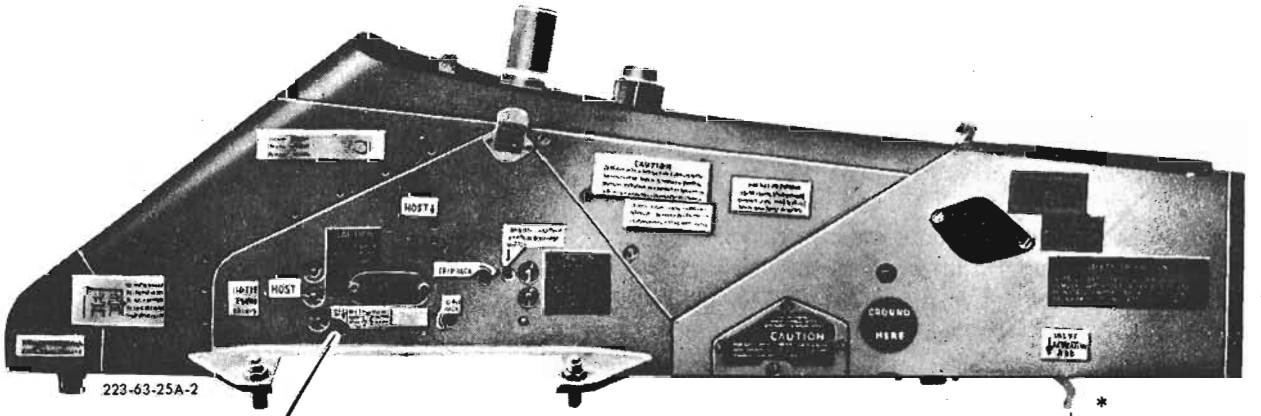
VALUE ACTUATOR ARM UP

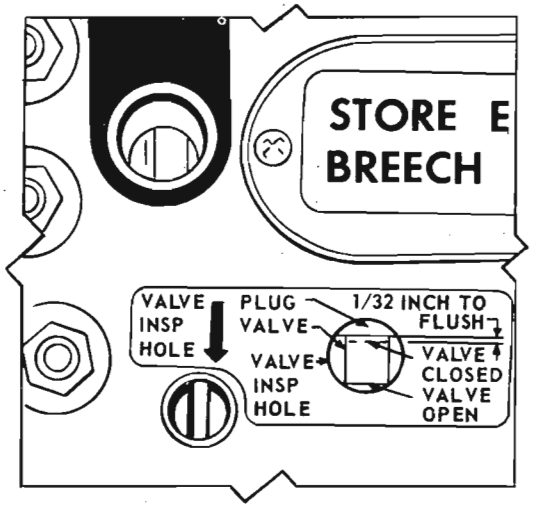
NOTE

On pylons changed by T.O. 11B81-2-530, selection is made by turning the manual wrenching actuator on the side of the aft fairing.

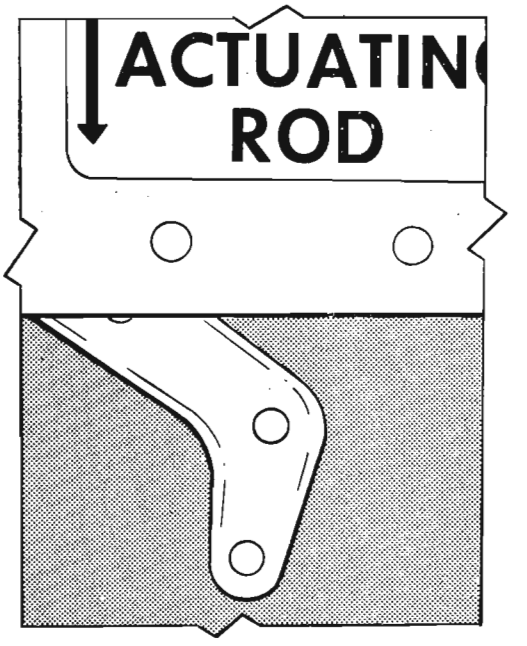
*Pylons not changed by T.O. 11B81-2-530.

Figure 1-37. Type I Series Pylon, F-100D/F (Typical) (Full Power Ejection) (Sheet 1 of 2)





VALVE INSPECTION HOLE NOT CLEAR
(LOW BLOW)



VALVE ACTUATOR ARM DOWN

*Pylons not changed by T.O. 11B81-2-530.

Figure 1-37. Type I Series Pylon, F-100D/F (Typical) (Partial Power Ejection) (Sheet 2 of 2)

TYPE III SERIES, F-100C AIRPLANES. The Type III pylon, is a streamlined metal enclosure, contoured to be installed at the intermediate wing station 106 or outboard wing station 155 on F-100C airplanes. The basic features of the pylon are shown in figure 1-38. The pylon is bolted to the airplane wing through two fittings in the upper portion of the pylon. The pylon is stabilized by a sway strut. One end of the strut is attached to the inboard side of the pylon, and the other end is attached to fittings on the airplane wing structure.

The pylon consists of the pylon assembly, ejector rack assembly, external fuel tank equipment, mechanical linkage, and an electrical harness assembly. The pylon permits carriage of conventional bomb-type munitions, rocket launchers, bomb dispensers, tow-target equipment, and/or an external fuel drop tank. When an external fuel drop tank is installed on the pylon, the pylon actuator cover arm lever must be rotated away, exposing the pylon lower fuel interconnect. This action manually causes the mechanical linkage within the pylon to move the ejector rack slide valve mechanism to a full-power (high-blow) position.

When other tank-type stores which are restricted for partial-power (low-blow) ejection are loaded on the pylon, the actuator cover arm lever arm is rotated open. When a bomb-type store which does not require full-power (high-blow) ejection is loaded on the pylon, the actuator cover arm lever is left in the closed position. The mechanical linkage connected to the lever causes the ejector rack slide valve mechanism to be positioned for partial-power (low-blow) ejection. The internal linkage of all type III series pylons is designed such that manual release of stores is possible only when the slide valve mechanism is selected to the partial-power (lo-blow) position.

Included in the pylon body assembly are a fuel dive vent fitting, chemical tank binding post, resistors, quick-disconnect plug arrangements, and air- and fuel-line transfer provisions for an external fuel drop tank. The fuel vent outlet is toward the rear and protrudes at the side of the pylon. Also included as part of the pylon internal mechanical linkage are a wrenching shaft and fitting on the side of the pylon. Thie permits use of a wrench to apply extra force when positioning the mechanical linkage to cycle the ejector rack slide valve mechanism. Four sway-brace studs, two on each side of the pylon, prevent lateral movement of a store after it is loaded.

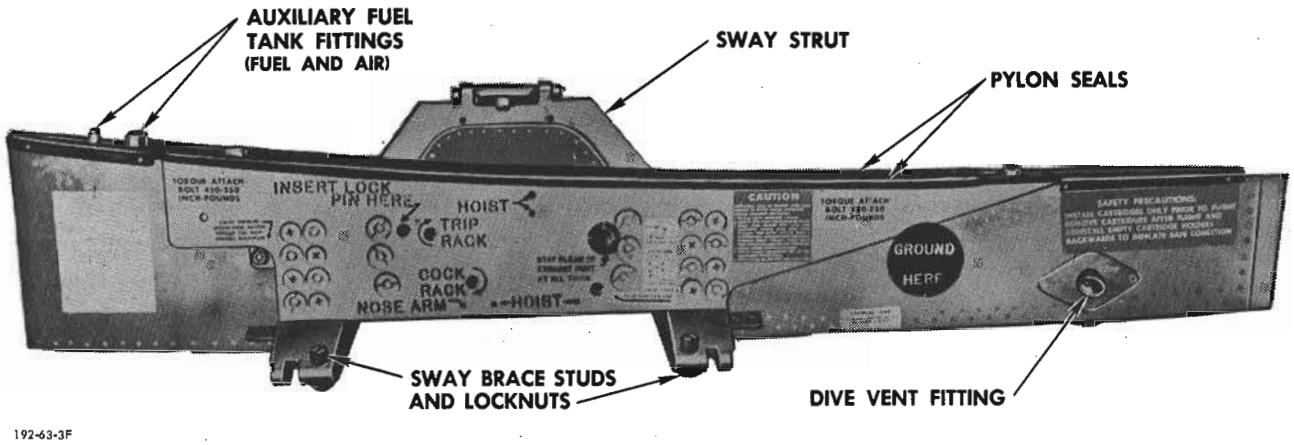


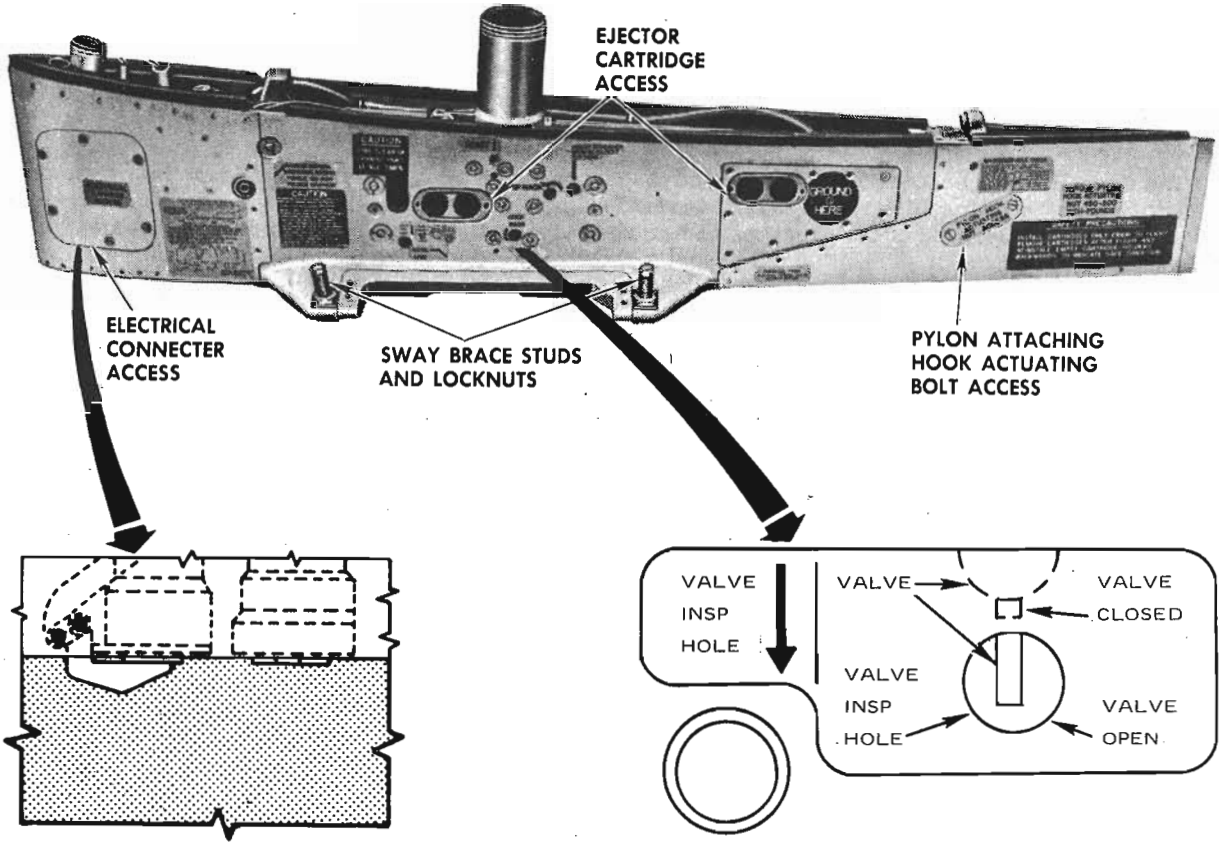
Figure 1-38. Type III Series, F-100C (Typical)

TYPE III SERIES, F-100D/F AIRPLANES. The Type III pylon (figure 1-39) is a streamlined metal enclosure, contoured to be installed at intermediate wing station 106 or outboard wing station 155. The pylon is attached to the airplane wing by inserting the pylon support post into the wing station cylinder sleeve, and mating and tightening the pylon attach hooks to the wing station cylinder sleeve, and mating and tightening the pylon attach hooks to the wing station attach fittings. This pylon has jettisoning features that permit the pylon to be ejected during flight. Power required to eject the pylon from the airplane is obtained from combined explosive charges of two removable, electrically fired cartridges in the pylon. These charges are ignited by the airplane armament circuitry. When the cartridges are fired, expanding gases are ducted to the pylon post inner piston frangible link. The frangible link breaks and the pylon attach hooks are forced open. The gas pressures in the pylon support post then push the pylon away from the airplane wing. The pylon structure contains necessary plumbing and fittings for installation of drop tanks, electrical wiring provisions for connection of stores and/or an ejector rack assembly.

The ejector rack is a separately contained unit installed as a complete assembly in the pylon. The rack is constructed with 14-inch hook spacing to carry and release stores or munitions with 14-inch suspension-lug spacing. The stores or munitions may be forcibly ejected from the rack hooks or released to fall of their own weight. Power required to eject the store or munition from the rack hooks is obtained from combined explosive charges of two removable, electrically fired impulse cartridges in the rack. These cartridges are ignited by the airplane armament circuitry. When cartridges are fired, expanding gases are channeled through a manifold to the ejector pistons and the rack unlocking piston. The ejector rack mechanism is designed so that the unlocking piston releases the rack hooks and the ejector piston force the store or munition away from the rack simultaneously. The ejector pistons remain extended after store release. The rack manifold is designed with a two-position, sliding metering valve. The pylon utilizes a valve actuator arm and connecting linkage to position the pylon slide valve in the ejector rack for either partial-power (low-blow) or full-power (high-blow) ejection, depending on which store or munition is being used. With the pylon valve actuator arm full forward and up, (air valve exposed) the linkage connected to the arm properly positions the pylon slide valve closed. This contains the expanding gases and results in full-power ejection to the store.

When stores that require partial-power (low-blow) ejection at bomb release are loaded, the pylon valve actuator arm must be positioned fully aft and up, (air valve covered). This opens the slide valve in the rack, allows a portion of the gas to escape, and results in a partial-power ejection at bomb release.

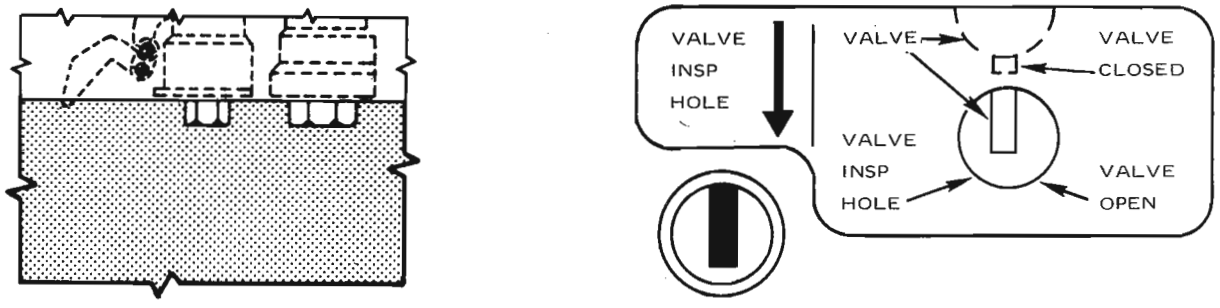
The internal linkage of all type III series pylons is designed such that manual release of stores is possible only when the slide valve mechanism is selected to the partial-power (lo-blow) position. A rack release mechanism at the pylon facilitates removal of stores or munitions. Two horizontally opposed arming solenoids in the rack provide for nose and tail, or tail-only, arming of the bomb fuzes. The bomb may also be released with fuzes unarmed. As viewed looking forward, the nose arming solenoid is on the left side of the rack, and the tail arming solenoid is on the right side.



VALVE ACTUATOR ARM FULL FORWARD AND UP

VALVE INSPECTION HOLE CLEAR (HIGH BLOW)

FULL POWER EJECTION



VALVE ACTUATOR ARM FULL AFT AND UP

VALVE INSPECTION HOLE NOT CLEAR (LOW BLOW)

PARTIAL POWER EJECTION

Figure 1-39. Type III Series Pylon, F-100D/F (Typical)
All data on page 1-53, including figure 1-39 deleted.

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TYPE VII SERIES, F-100D/F AIRPLANES. The Type VII pylon (figure 1-40) is a streamlined metal enclosure, contoured to be installed at the fuselage centerline station. The pylon is attached to the fuselage and is jettisonable in the same manner described above for the F-100D/F type I pylon. Two sway braces, one on each side of the pylon, are installed between the pylon and the fuselage. Normal speed brake operation is available with all centerline stores.

NOTE

On aircraft not changed by T.O. 1F-100-882, speed brake operation is not available with a centerline store installed.

The pylon jettison circuits tie into the fuselage centerline store indicating switch. In addition to preventing speed brake operation (unmodified airplanes), the switch supplies an electrical interruption, to prevent jettisoning of the pylon with the sotre attached. Only after the store is released are the switch contacts closed, and pylon jettison can occur at the discretion of the pilot.

When a SUU-21/A dispenser is installed on the pylon, the cycling impulse to operate the dispenser mechanism is controlled by the special store release circuitry. A jumper in the dispenser wiring routes the dispenser jettison signal to the pylon jettison cartridges, so that the dispenser cannot be jettisoned separately. The dispenser is jettisoned with the pylon by the pylon jettison circuit.

CAUTION

The special store unlock handle must be stowed when the SUU-21/A dispenser is carried at the fuselage centerline station: If it is in the unlocked position when the bomb button is pressed, the dispenser will be released from the pylon and may strike the airplane.

When any other type of store is installed, on the pylon, the store must be released first; then the pylon may be jettisoned.

The release rack is a separately contained unit installed as a complete assembly in the pylon. The rack is constructed with 30-inch hook spacing. The stores are released electrically. A rotary electrical solenoid is connected to the rack linkage to actuate the release latch. This causes the rocker and bellcrank link assembly to open the release hooks. The rack incorporates a SPL STORE SAFETY switch which is actuated (closed) when the rack is unlocked by pulling the SPL STORES UNLOCK handle from the stowed position. This switch serves three purposes: it electrically closes the normal bomb release circuit, the emergency jettison circuit, and the pylon jettison circuit. It also energizes the SPL STORE UNLOCK IND light next to the SPL STORE UNLOCK handle in the cockpit. When the safety lock release system is positioned to prevent store release, it prevents the release solenoid from rotating and tripping the rack. An arm "safe-unsafe" inspection is required to ascertain that the solenoid locking arm is flush or below the link when the rack is fully cocked. Two sets of visual-aids decals are shown on the pylon: pylon rack SAFE, UNSAFE; and SPL. WEAPONS SAFETY LOCK INSP (see Figure 1-40). A rack release control at the pylon facilitates removal of stores on the ground.

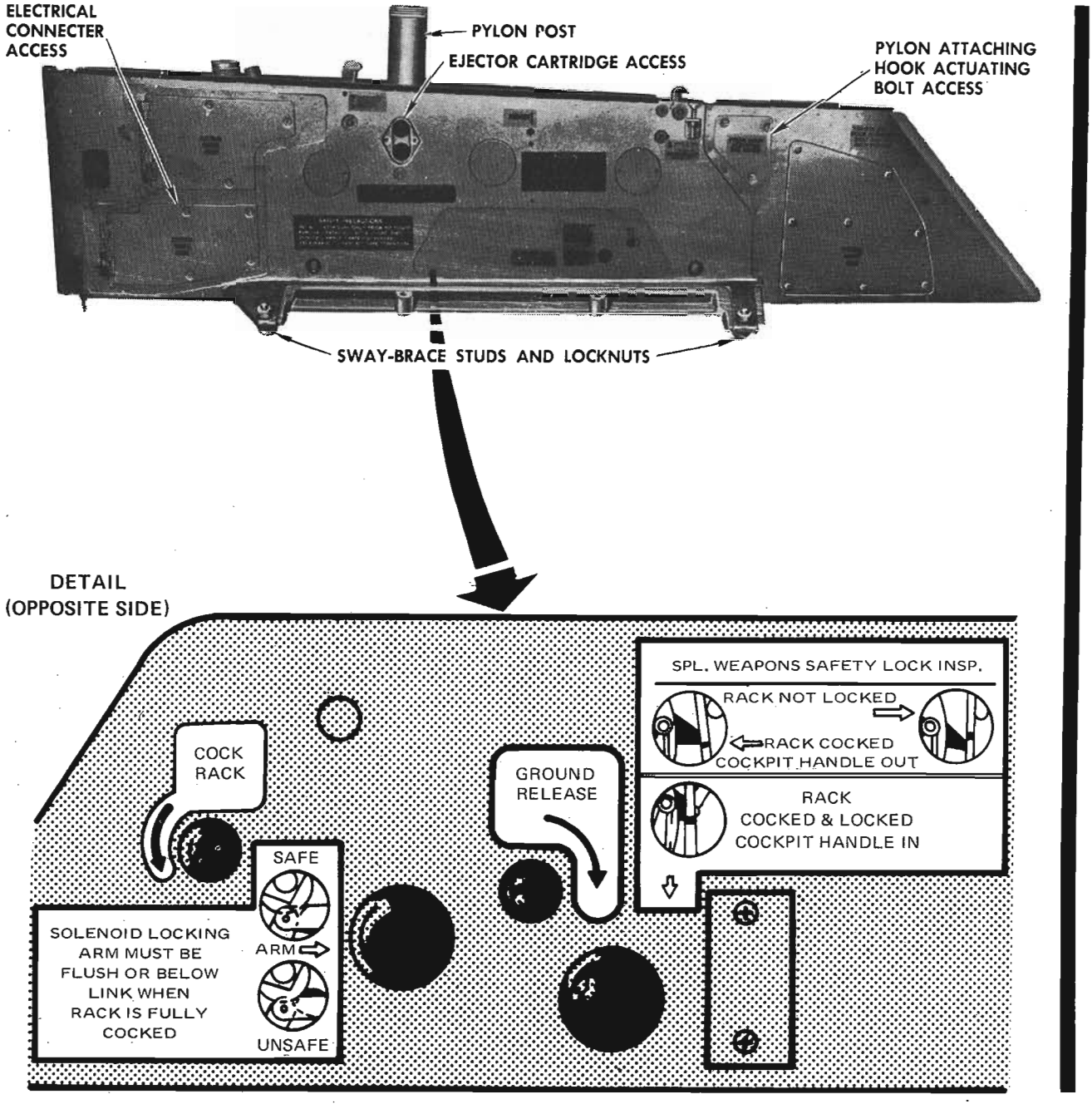

Figure 1-40. Type VII Series Pylon, F-100D/F (Typical)

TYPE VIII SERIES, F-100D/F AIRPLANES. The Type VIII pylon (figure 1-41) is a streamlined metal enclosure, contoured to be installed at intermediate wing station 106. The pylon is attached to the wing and is jettisonable in the same manner described above for the F-100D/F type III pylon. A store-installed PYLON JETTISON SAFETY switch is installed in the pylon to indicate whether a special store is installed. The pylon jettison circuit is interrupted by this switch when a special store is installed, preventing jettisoning of the pylon with the store attached. This in no way affects tanks and/or dispensers. The pylon structure contains necessary plumbing and fittings for installation of drop tanks, electrical wiring provisions for connection of stores and/or munitions, a rack release mechanism and ejection piston assemblies.

The rack release mechanism is a separately contained unit designed to operate the 20 and 30-inch spaced hooks contained in the pylon, and, as required for the store being carried, channel gas pressure to extend the store ejector pistons. Heavier stores are released to fall of their own weight; at this setting the pistons do not extend.

Power required to eject or release the store or munition from the rack hooks is obtained from the combined explosive charges of two electrically fired impulse cartridges. Power selection is made by a two-position, sliding metering valve which is manually positioned during loading and checked through inspection holes in the sides of the pylon, (Figure 1-41). When a nuclear store or similar shape is loaded, the rack is positively locked by a mechanism which is controlled by the SPL STORE UNLOCK handle in the cockpit.

The rack incorporates a SPL STORE SAFETY switch. The switch is actuated (closed) when the rack is unlocked by pulling the SPL STORES UNLOCK handle from the stowed position. The switch serves three purposes: it electrically closes the normal release circuit, the emergency jettison circuit, and the intermediate auxiliary release circuit. A SAFETY LOCK CONTROL relay in the circuit energizes the SPL STORE UNLOCK IND light next to the SPL STORE UNLOCK handle in the cockpit. The safety switch may also be actuated automatically (closed) when a dispenser is installed. When a SUU-21/A dispenser is installed, the special store normal release signal is used for bomb release and dispenser cycling. A rack release control is also provided at the pylon to facilitate removal of the stores on the ground.

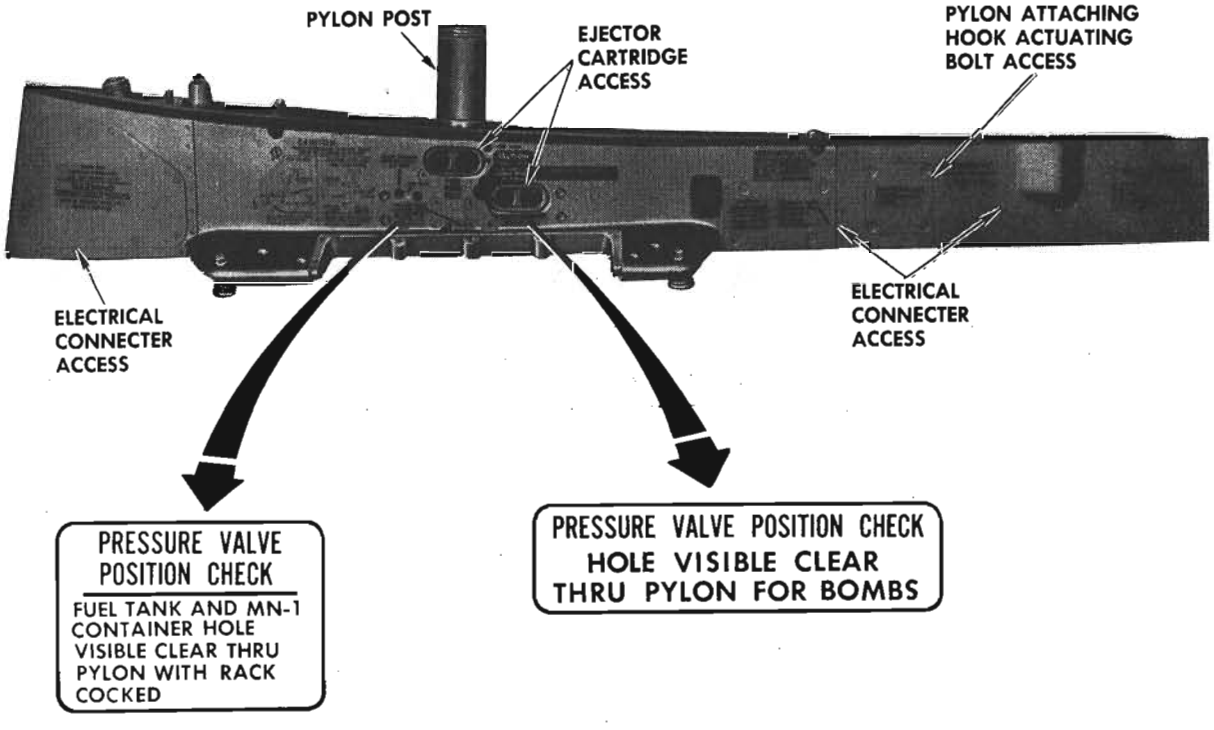
PYLON POST
EJECTOR CARTRIDGE ACCESS
PYLON ATTACHING HOOK ACTUATING BOLT ACCESS
ELECTRICAL CONNECTER ACCESS
ELECTRICAL CONNECTER ACCESS
PRESSURE VALVE POSITION CHECK
FUEL TANK AND MN-1 CONTAINER HOLE VISIBLE CLEAR THRU PYLON WITH RACK COCKED
PRESSURE VALVE POSITION CHECK
HOLE VISIBLE CLEAR THRU PYLON FOR BOMBS

Figure 1-41. Type VIII Series Pylon (F-100D/F Aircraft) [Valve Inspection Holes]

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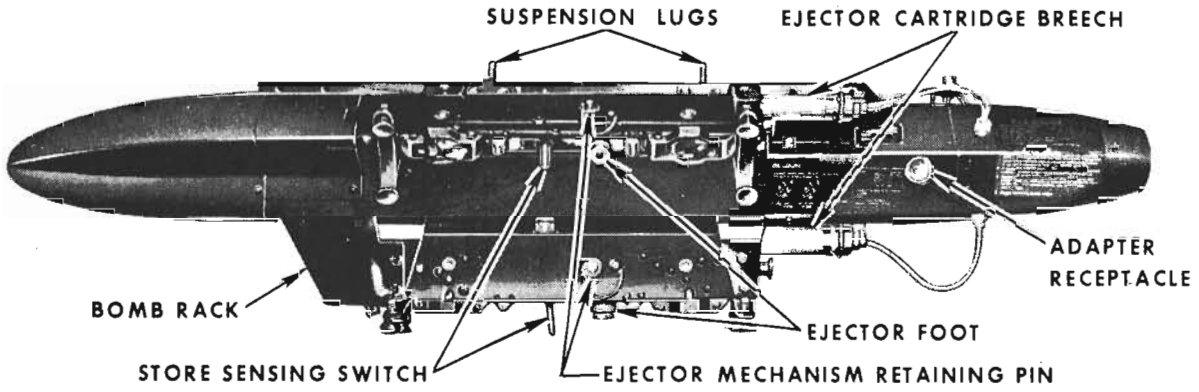
Triple Ejector Rack – TER-15. The TER-15 triple ejector rack (figure 1-42) consists of a housing and three individual bomb racks that permit multiple carriage of weapons on series 1 pylons at the inboard wing stations. The TER-15 is adapted to be carried from pylons having 14-inch suspension provisions, and each bomb rack can accommodate such weapons with 14-inch suspension lugs as general-purpose fire, leaflet, and gas bombs, land mines, and CBU dispensers. Nose- and tail-arming solenoids are contained within each bomb rack. An electrical adapter receptacle is at the rear of each bomb rack for connection of weapons that require electrical power. Electrical circuitry within the TER housing controls bomb rack release and/or firing sequence upon receipt of signals from the airplane armament system. A stepping switch in each TER bomb rack requires a minimum of 60 milliseconds between release pulses. An electrical safety pin (for ground use) is inserted through a switch plate at the aft end of the TER housing to interrupt any inadvertent electrical signal. Weight of the TER-15, assembled and empty, is approximately 100 pounds. It is 67 inches long, 16 inches wide, and 15.5 inches high.

CAUTION

On F-100D airplanes changed by T.O. 1F-100D-632, the upper 20mm guns must not be fired as long as a store of any kind is carried on the inboard rack of either TER. This restriction is required to prevent spent 20mm casings from striking and damaging the stores or ricocheting off the stores and damaging the airplane.



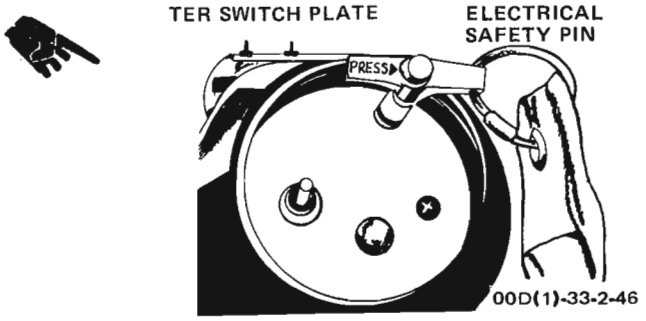


Figure 1-42. Triple Ejector Rack – TER-15

LAUNCHERS

TYPE VI LAUNCHER/ADAPTER, F-100C AIRPLANES. The Type VI missile launcher/adapter is a streamlined metal enclosure, contoured to be installed at the left wing inboard station 55 on F-100C Aircraft. (See figure 1-43.) The launcher/adapter is bolted to the aircraft wing. No jettisoning provision is supplied for the launcher/adapter; therefore it cannot be released or ejected during flight. In case of an emergency, the missile or rocket may be safe-launched, thereby removing the munition from the aircraft. The launcher/adapter structure contains the missile system control relay panel and necessary wiring harness and adapter disconnects.

Two rail-type AERO 3B launchers are bolted to the Type VI launcher/adapter. The launchers provide for carrying and releasing AIM-9 missiles and TDU-11/B target rockets. Each launcher is designed as a separate unit to be bolted at either launcher/adapter provision. Each launcher is provided with a cast-aluminum nose cover and a removable, sheet-metal external cover. The nose cover is hinged to permit access to the launcher umbilical receptacle. A spring-loaded latch secures the nose cover in place. A 3/8-inch hex wrench is used to release the latch. The launcher is equipped with a detent latch, to retain the missile or rocket on the launcher, and snubber bars which wedge the missile or rocket suspension lugs firmly in place, to prevent missile or rocket sway during flight. A forward thrust of 1450 to 1550 pounds is required to overcome the spring tension of the detent latch. An umbilical receptacle on the forward end of the launcher and two contact points in the detent latch provide for electrical connection of the missile. The missile power-supply unit is mounted on top of the launcher rails, below the external cover. A safety switch, about 2 inches behind the launcher umbilical receptacle, interrupts the missile motor firing circuit whenever the launcher safety pin is installed. A jack plug receptacle, on the rear of the launcher, provides for electrical connection of a rocket.

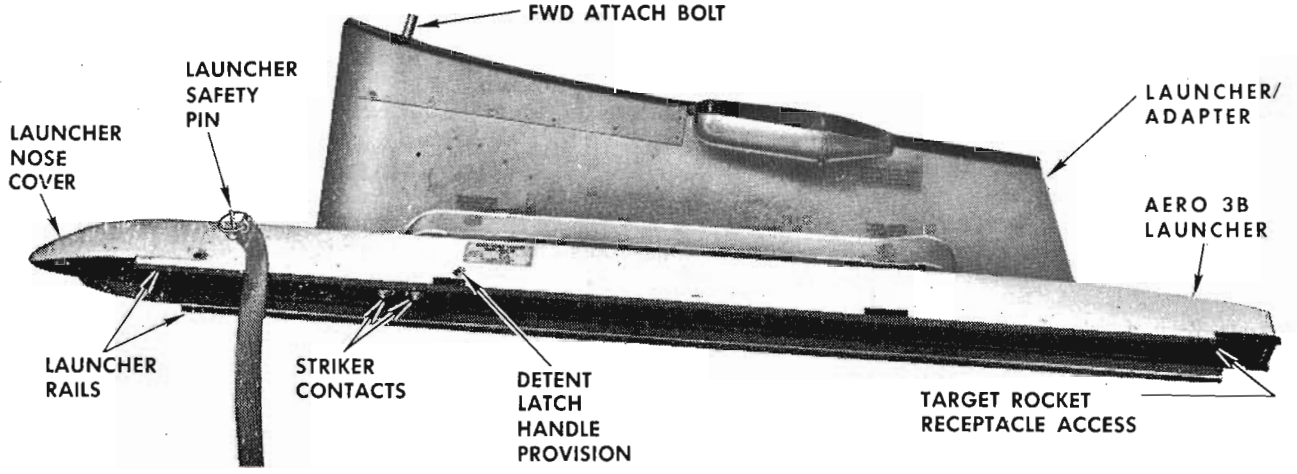


Figure 1-43. Type VI Launcher/Adapter, F-100C

TYPE IX SERIES, F-100D/F AIRPLANES. The Type IX launcher (figure 1-44) is a streamlined metal enclosure, contoured to be installed at inboard wing station 55. The launcher is designed for either left or right wing installation, being attached to the wing and jettisonable in the same manner as described above for the type I pylon. The launcher structure contains two rail-type launchers, missile power supply units, missile firing and interlock relays, and other electrical equipment to control the guidance and launching units of the missile or rockets. The launcher rails, although detachable, becomes an integral part of the launcher assembly when they are installed. The launcher provides for carrying and firing an AIM-9 missile or a TDU-11/B target rocket. The launcher assembly is equipped with a detent latch, to retain the missile or rocket on the launcher rail, and snubber bars wedge the missile or rocket suspension lugs firmly in place, to prevent missile or rocket sway during flight. A forward thrust of 1,450 to 1,550 pounds is required to overcome the spring tension of the detent latch. A detent latch handle, on the side of the launcher, raises and lowers the detent latch to facilitate the unloading and loading, respectively, of the missile or rocket.

An umbilical receptacle on the forward end of the launcher rail and two contact points in the detent latch provide for electrical connection of the missile. The missile-power-supply unit is on top of the launcher rails. A safety switch, about 2 inches behind the launcher umbilical receptacle, interrupts the missile motor firing circuit when the launcher safety pin is installed. A jack plug receptacle, on the rear of the launcher rails, is for electrical connection of a rocket.

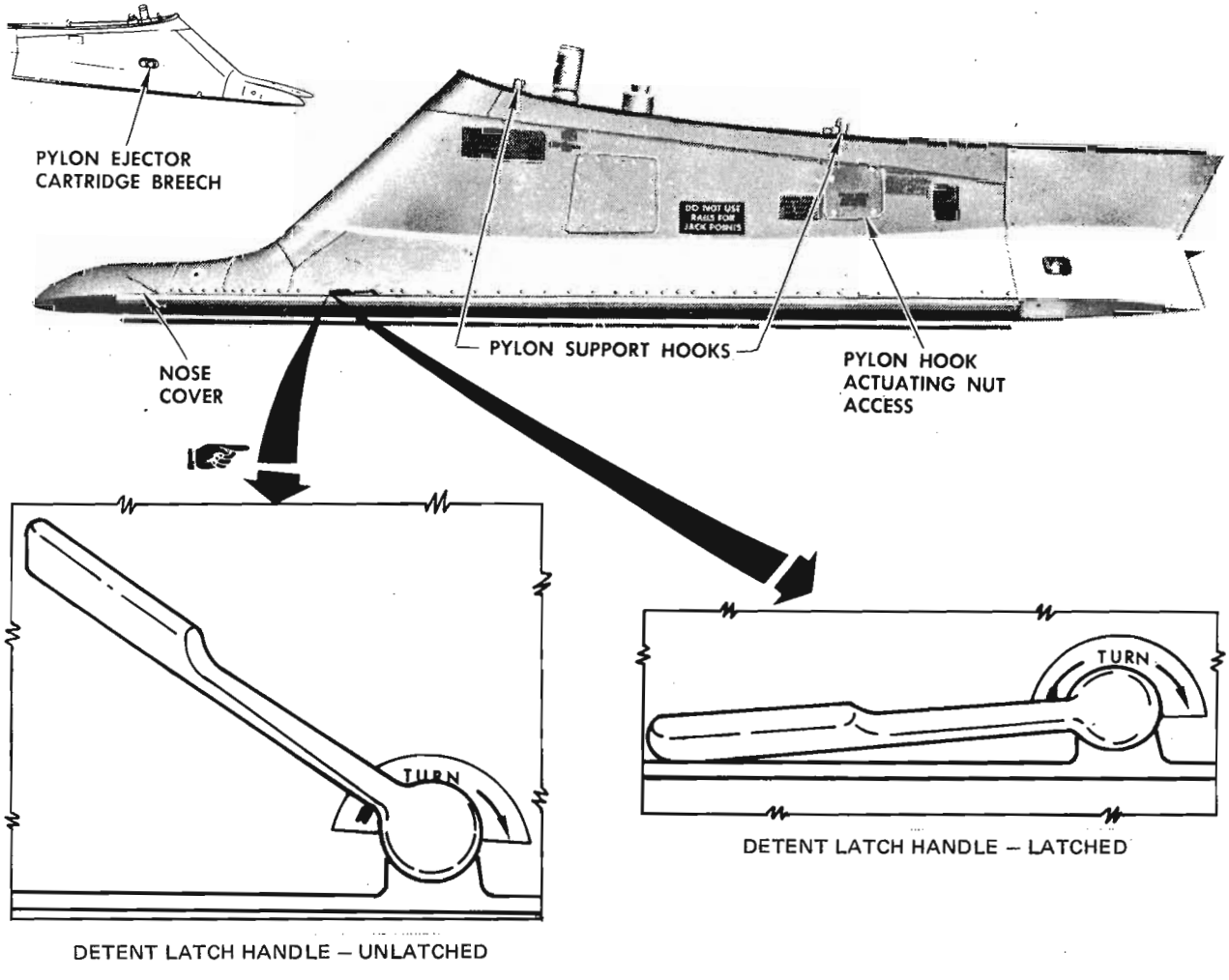


Figure 1-44. Type IX Series, F-100D/F

EXTERNAL LOAD CONFIGURATION LIMITATIONS.

Several thousand external loading configurations are approved for this airplane and can be selected from the applicable charts in the Flight Manual. These configurations have been determined as safe for flight before being approved. Without knowing all the factors which affect the acceptability of a loading configuration, one could assume that two apparently similar configurations should be accepted when one of them is already listed as approved. Such an assumption, however, is dangerous. The subject of effects of externally carried stores on aircraft is complex, especially for a high-swept wing airplane of this type. All factors which can affect acceptability of loading configurations and limitations for the airplane, such as structural, flutter, aerodynamic and CG limitations, and controllability requirements, must be considered in determining acceptability of any loading configuration. The following discussion considers only those factors affecting the airplane flying qualities.

First, every configuration must possess satisfactory airplane longitudinal stability and control characteristics. For this, each configuration considered must be carefully examined to see that the airplane in-flight CG travel due to expenditure of internal and external fuel, external stores, pylons, and ammunition stays within the established CG limits of the configuration throughout the flight envelope. Airplane control requirements usually establish forward CG limits on takeoff, maneuvering, and landing. Airplane longitudinal stability requirements determine the aft CG limit for a store loading configuration. This differs from the clean airplane in that it slufts because of destabilizing effects of the stores on the airplane longitudinal stability. Destabilizing effects of stores of the same weight vary with their sizes; shapes; whether the stores have fins; and fore-and-aft, lateral, and vertical locations with respect to the airplane wing or fuselage. Even the same store could vary its destabilizing effect, depending on the store location on the wing. For instance, a store such as a 200-gallon tank mounted at an inboard station destabilizes the airplane more than the same tank at an intermediate or outboard wing station. In addition, CG position is affected by store location. Stores mounted inboard always move the CG forward. Stores at the intermediate station have the least effect on CG but do move it slightly aft. Stores outboard always move the CG aft. Particular attention is given to the airplane aft CG shift due to surging external and internal fuel during the takeoff acceleration. A certain configuration with external fuel tanks (full or partially full) may appear to have acceptable CG conditions at the initiation of takeoff ground roll; however, during the acceleration and takeoff phase before assuming the climb attitude, the airplane CG can shift considerably aft of the established aft CG limit.

The analysis required to determine acceptability of loading configurations must consider the desired sequence for releasing stores and selecting the drop tank fuel; in addition, the analysis considers single-failure conditions, such as failure of the store to release or of drop tank fuel to transfer. These effects on configuration acceptabilty must also be examined to determine whether any special limitation or operational procedure is necessary to keep the airplane CG within the limits at any time. Every loading configuration under consideration must be examined for satisfactory level of airplane directional stability. Destabilizing effects of external stores will reduce the directional stability margin of the airplane. This effect is most pronounced at the inboard wing stations; it usually varies with store sizes, shapes, and fore-and-aft and vertical locations with respect to the airplane wing. Also, in some asymmetrical loading configurations, the demand on directional trim control may become excessive at certain flight conditions. In these, analysis must be made to determine necessary flight restrictions.

In some asymmetrically loaded configurations, excessive weight on one wing requires an unusual amount of aileron control to hold the wings level. If lateral controllability is marginal for any phase of the flight, the configuration cannot be approved. Here, too, the effect of single failures must be considered in analyzing loading configurations. It is not in the interest of safe flight to assume that because two loading configurations appear to be similar, both are safe to fly.

NON-NUCLEAR WEAPONS—COMBAT.

M-39 Guns. The M-39 20 mm automatic gun (figure 1-45) is a gas-operated, manually charged, belt-fed, and electrically fired revolver-type weapon. It is capable of firing 1,500 to 1,700 rounds per minute, with a muzzle velocity of 3,250 feet per second. The guns are mounted in the lower forward section of the fuselage outboard of the nose wheel well. F-100C and F-100D airplanes have four guns, two on each side of the fuselage. F-100F airplanes have two guns, one on each side of the fuselage. Each gun weighs 179 pounds, and is 72.4 inches long, 12 inches high, and 12 inches wide. Ammunition may be fed from either the left or the right side by changing feeders and other components.

A metallic link belt (figure 1-46) of the disintegrating type is used to feed the ammunition into the gun. The main components consist of a barrel assembly, a receiver assembly, a drum and cradle assembly, a feeder assembly, and a gun charger assembly. Before loading, the 20 mm ammunition is assembled into cartridge belts. The belt is formed by inserting the 20 mm cartridges into individual cartridge links, which are then connected together by link rings. See figure 1-46.)

AMMUNITION BOXES. Four removable, metal ammunition boxes (figure 1-47) in two compartments in the upper forward fuselage provide a normal load of 200 rounds per gun for the F-100C and F-100D. For the F-100F, two ammunition boxes contain 175 rounds per gun.

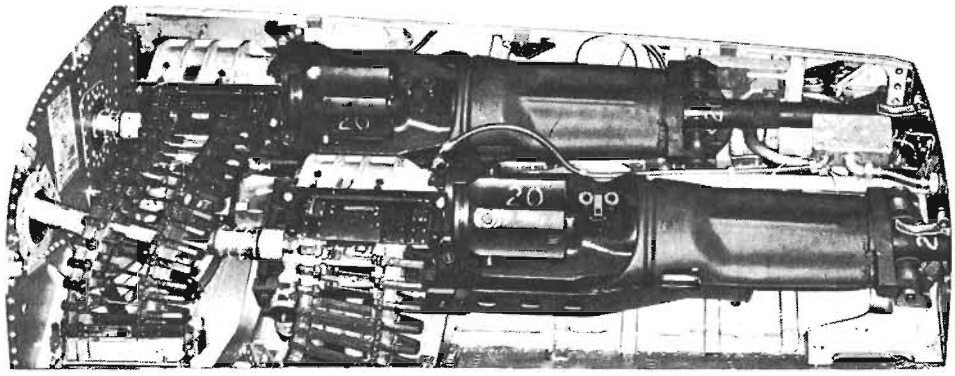


Figure 1-45. M-39 Gun

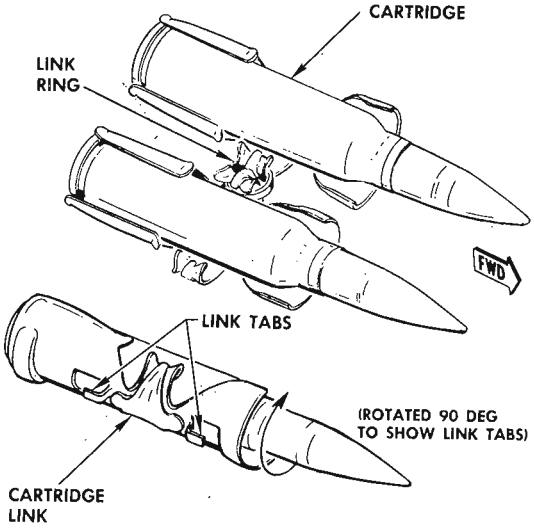
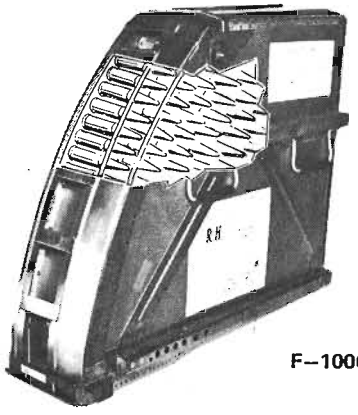
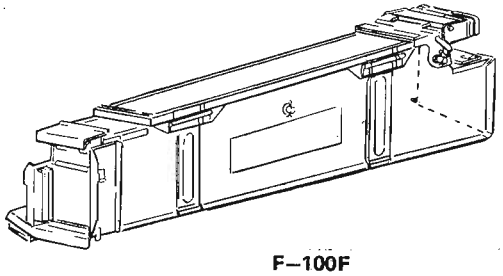


Figure 1-46. Link-Belt Assembly – 20 MM



F–100C/D



F–100F

Figure 1-47. Ammunition Boxes

Ammunition – 20 MM. All 20 mm ammunition for the M-39 gun is classified as artillery ammunition and is issued in the form of complete rounds of "fixed ammunition." A complete round, known as a cartridge, consists of a cartridge case, a projectile (bullet), propellant powder, and an electric primer. Certain 20 mm projectiles contain high explosives, and are assembled with point detonating fuzes. All 20 mm cartridges have a rotating band at the rear of the projectile, to effect projectile rotating (stabilizing it in flight) and to prevent the escape of propelling gases past the projectile during travel through the gun barrel.

The firing of a cartridge is initiated when the firing pin ignites the primer by means of an electrical impulse. The resulting flame passes through a vent leading to the propellant chamber and ignites the propelling charge. The expansion of the resulting gases forces the projectile out through the bore of the weapon. Upon impact, a fuze causes initiation of the explosive in one type 20 mm projectile (HEI), while initiation of an incendiary composition in another (API) is caused by the crushing force and heat generated upon impact.

Ammunition for the M-39 gun is further classified according to the type of projectile used. There are presently four types of cartridges available: target practice (TP), target practice-tracer (TP-T), armor-piercing incendiary (API), and high-explosive incendiary (HEI).

CARTRIDGE – 20 MM, TARGET PRACTICE (TP), M55A2. This cartridge (figure 1-48) is used for practice firing. The projectile consists of a body, a nose, and a rotating band. The body is made of steel, is hollow, and contains no filler. The brass cartridge case is loaded with approximately 0.084 pound of propellant and contains an electric primer.

CARTRIDGE – 20 MM, TARGET PRACTICE – TRACER (TP-T), M220. This cartridge (figure 1-49) is ballistically and physically identical to the M55A2 TP cartridge except that a tracer element has been added to the projectile. The tracer element is ignited by the muzzle flash when the round is fired.

CARTRIDGE – 20 MM, ARMOR-PIERCING INCENDIARY (API), M53A1. This cartridge (figure 1-50) is used against lightly armored targets, functioning with a combined incendiary and penetrating effect. The projectile consists of the following parts: a solid shot-body made from bar alloy steel, a rotating band attached to the lower part of this shot-body, a hollow cylindrical steel adapter that serves to join this shot-body with the projectile nosepiece, a hollow aluminum-alloy nosepiece charged with three separately pressed increments of incendiary composition weighing a total of 80 grains, and an aluminum-alloy closure disk to seal the incendiary charge in the nosepiece as well as to "lock" the nosepiece into the adapter during final assembly of the projectile. This cartridge does not require a fuze, since functioning is initiated by the collapse of the tip of the nosepiece on impact with the target. The nosepiece is, however, designed to withstand a 40-foot drop of the assembled cartridge onto a hard surface without functioning. The cartridge case is made of brass and contains an electric primer.

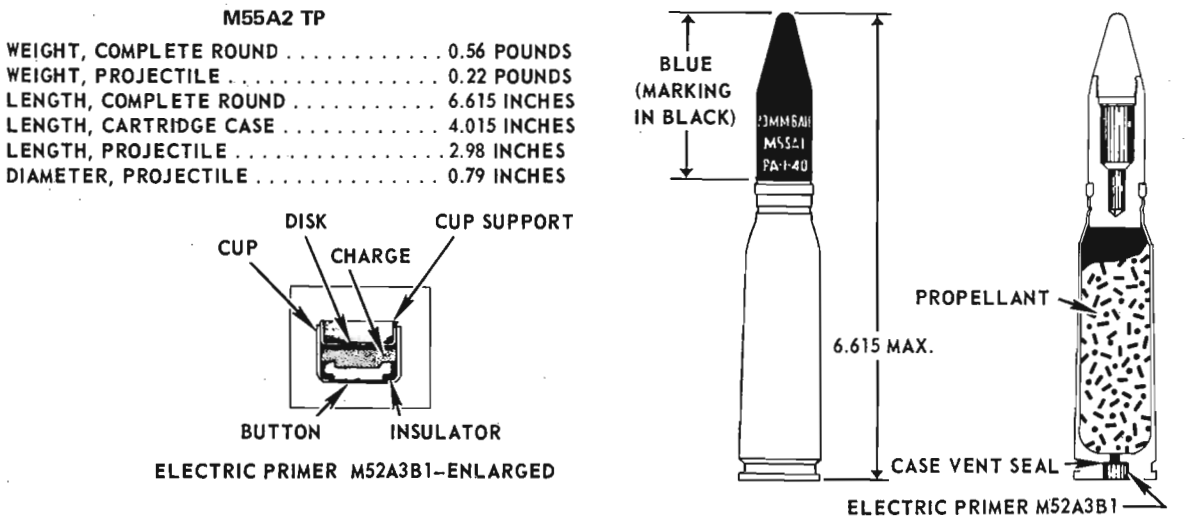


Figure 1-48. Cartridge – 20 MM, Target Practice (TP), M55A2

M220 TP-T

WEIGHT, COMPLETE ROUND	0.56 POUNDS
WEIGHT, PROJECTILE	0.22 POUNDS
LENGTH, COMPLETE ROUND	6.615 INCHES
LENGTH, CARTRIDGE CASE	4.015 INCHES
LENGTH, PROJECTILE	2.98 INCHES
DIAMETER, PROJECTILE	0.79 INCHES

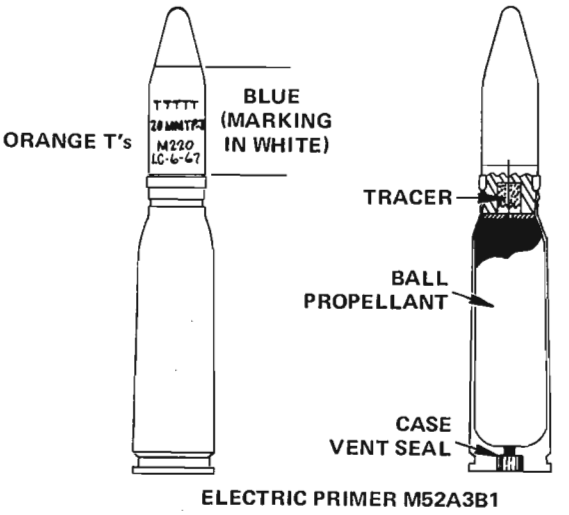


Figure 1-49. Cartridge – 20 MM, Target Practice – Tracer (TP-T), M220

M53A1 API

WEIGHT, COMPLETE ROUND	0.57 POUNDS
WEIGHT, PROJECTILE	0.22 POUNDS
LENGTH, COMPLETE ROUND	6.615 INCHES
LENGTH, CARTRIDGE CASE	4.015 INCHES
LENGTH, PROJECTILE	2.98 INCHES
DIAMETER, PROJECTILE	0.79 INCHES

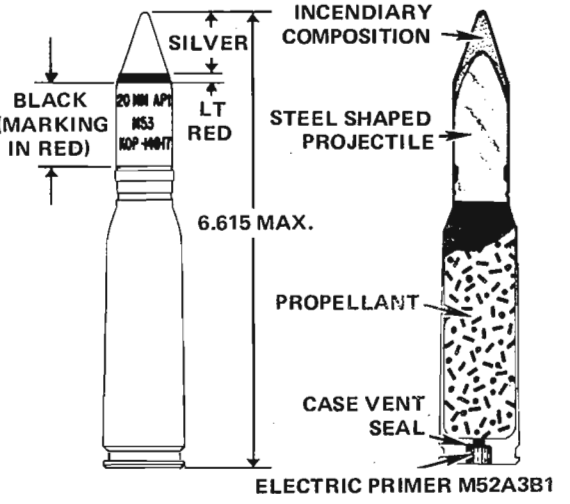


Figure 1-50. Cartridge – 20 MM, Armor-Piercing Incendiary (API), M53A1

CARTRIDGE-20 MM, HIGH-EXPLOSIVE INCENDIARY (HEI), M56A3, WITH FUZE. This cartridge (figure 1-51) is designed for use against aircraft and light-material targets. The projectile body is a relatively thin-walled steel casing. The weight of the high-explosive incendiary filler charge, a so-called aluminized-RDX composition, is approximately 0.024 pound. Upon impact, the charge functions with a combined detonation (i.e., blast and shell fragmentation) and incendiary effect. Functioning is initiated on impact of the M505A3 point-detonating (nondelay) type fuze with the target. The brass cartridge-case is loaded with approximately 0.085 pound of double-base, ball-type propellant powder, and contains an electric primer. In normal firing, energizing of the firing circuit provides the electrical energy required to fire the primer, which in turn ignites the propellant charge.

M56A3 HEI

WEIGHT, COMPLETE ROUND	0.56 POUNDS
WEIGHT, PROJECTILE	0.22 POUNDS
LENGTH, COMPLETE ROUND	6.615 INCHES
LENGTH, CARTRIDGE CASE	4.015 INCHES
LENGTH, PROJECTILE	3.025 INCHES
DIAMETER, PROJECTILE	0.79 INCHES

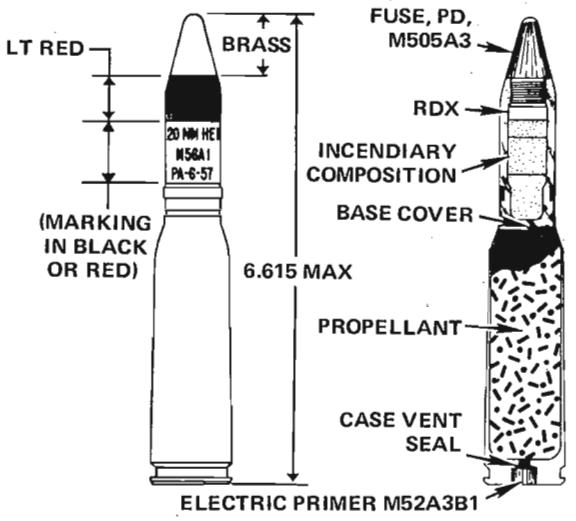


Figure 1-51. Cartridge – 20 MM, High-Explosive Incendiary (HEI), M56A3, With Fuze

M505A3 FUZE. 20 mm HEI projectiles require a fuze that serves as the initiating and booster elements required to complete the normal explosives train. The point-detonating M505A3 fuze (figure 1-52), utilized with the M56A3 HEI cartridge, has a ball-rotor type delayed-arming and detonator-safety feature providing both bore and detonator safety. A bore-safe fuze is one in which the explosives train is interrupted until after the projectile, with fuze, has emerged from the muzzle of the gun, thus providing assurance against premature functioning while the projectile is still in the barrel of the gun. A detonator-safe fuze is one in which the method utilized for providing bore-safety normally also provides assurance against the premature functioning of the booster and main charge elements of the explosives train in case of nonnormal functioning of the initiating element, the detonator, as, for example, by cookoff, while the projectile is in the barrel or before normal "arming' of the fuze. The M505A3 fuze has a delayed-arming distance of 15 to 25 feet from the gun muzzle. Before firing of the HEI projectiles, the rotor containing the detonator (which is out of line with both the firing pin and the booster) is locked in the "safe' condition by a rotor-detent safety spring. Centrifugal force, created by the spin imparted to the projectile by the rifling (i.e., twist of lands) of the barrel, allows the explosives-train components to aline, thus effecting arming of the fuze. Once armed, the fuze may function on impact with target material of sufficient substance to crush the nose of the fuze and force the firing pin against the now alined detonator, thus initiating the explosives train which results in detonation of the projectile. After fuze impact, the projectile continues its approximately normal flight upon light targets. During the finite, although nearly instantaneous, time of functioning of the initiating elements of the explosive train, the actual detonation of the explosives train occurs during or just after its passage through such light-target material as the "skin" of a target airplane.

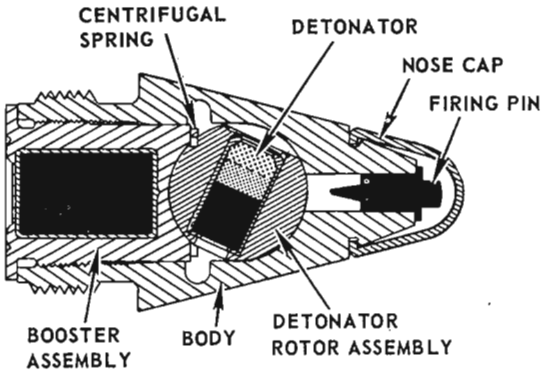
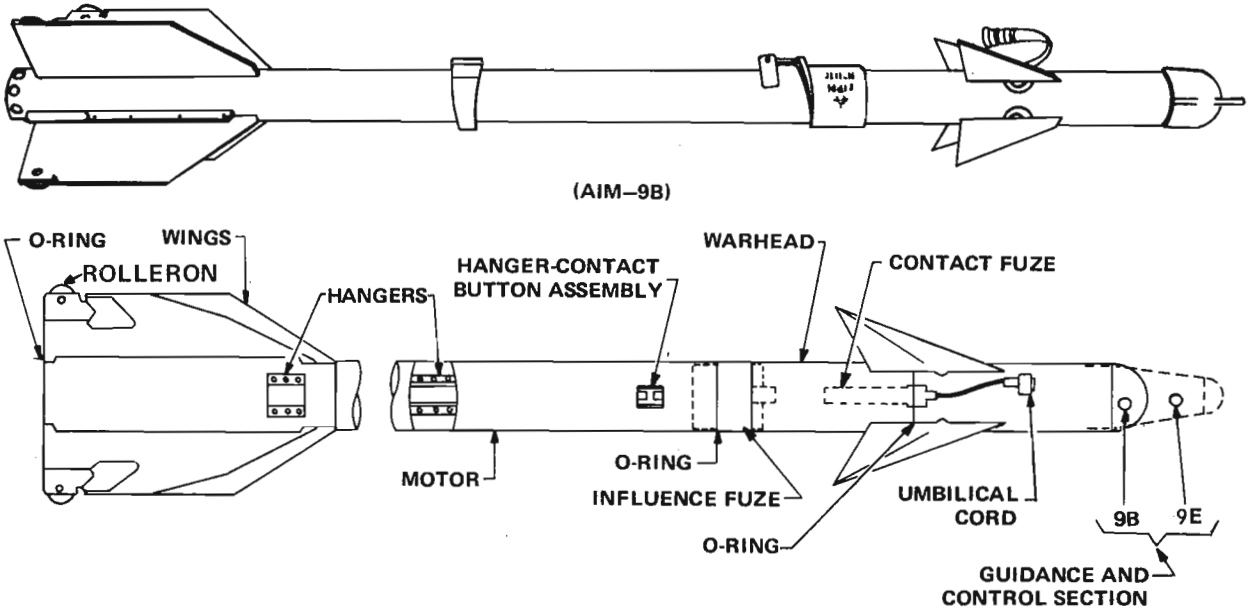
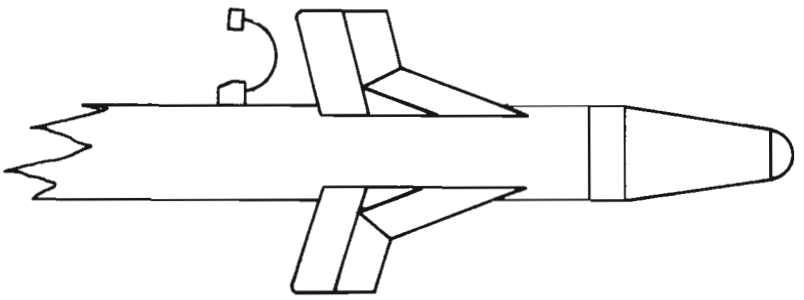


Figure 1-52. M505A3 Fuze

AIM-9B, -9E, and -9J Missiles (Sidewinder). The AIM-9( ) (Sidewinder) guided missiles (figure 1-53) are supersonic air-to-air homing weapons that use infrared passive target detection, proportional navigation guidance, and a torque balance control. The missiles are designed to be launched from an airplane external-mounted, rail-type launcher. The AIM-9B weighs 164.3 pounds, is 111.5 inches long and is 5 inches in diameter. The AIM-9E weighs 168.5 pounds, is 118.5 inches long and is also 5 inches in diameter. The AIM-9J weighs 170.9 pounds, is 123.2 inches long and 5 inches in diameter. Each missile consists of four sections: the guidance and control section, a warhead, an influence fuze assembly, and a rocket motor section. All sections have threaded ends to provide for assembly. The guidance and control section contains the missile directional control units, a turbo-generator'electrical unit, and four control fins (span 21.5 inches). A contact fuze is mounted into the aft end of this section. The warhead is assembled to the aft end of the guidance and control section. The influence fuze assembly is mounted on the aft end of the warhead. A missile forward suspension lug is attached to the top of the influence fuze assembly. The rocket motor section is mounted on the aft end of the influence fuze assembly. Four stabilizing fins are attached at points equidistant around the rocket motor. A rolleron device which effectively opposes the roll rate of the missile during flight is mounted on each fin. The missile aft suspension lug is attached to the top of the rocket motor section. An umbilical cable and two contacts mounted in the forward suspension lug is attached to the top of the rocket motor section. An umbilical cable and two contacts mounted in the forward suspension lug provide for electrical connection of the missile to the airplane missile firing circuitry. The umbilical cable is attached to a connector that shears when the missile is launched. Since all three missiles have the same performance data and flight limits, they can be used interchangeably, and the nomenclature 'AIM-9B/E/J' will be used. Refer to the classified supplement, T.O. 1F-100D(I)-34-1-1B, for additional information on this missile.





AIM-9J,

Figure 1-53. AIM-9B, -9E, and -9J Missiles

TDU-11/B 5-inch HVA Target Rocket. The TDU-11/B non-maneuvering target rocket (figure 1-54) is a standard 5-inch, high-velocity aircraft rocket (HVAR) modified to provide a training target for the AIM-9B/E missile. The rocket is fired from the same type launchers as the AIM-9B/E missile. Basic components of the rocket are the motor, tracking flares, and target kit consisting of a machined steel head, fin assembly, and center band. Suspension of rocket is provided by brackets attached to the head, center band, and fin assembly. Visual and infrared augmentation is given by two parasitic tracking flares which are attached to the fin assembly. The igniter wire assembly provides for electrical connection of the rocket to the aircraft missile firing circuitry. When fully assembled, the target rocket weighs approximately 215 pounds, is 75 inches in length, and is 5 inches in diameter.

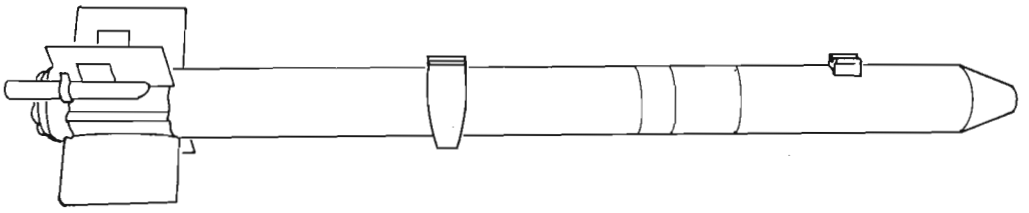


Figure 1-54. TDU-11/B 5-inch HVA Target Rocket

2.75 Inch Folding Fin Aircraft Rocket (FFAR). The 2.75-inch FFAR (figure 1-55) is designed for air-to-air and air-to-ground combat. The rocket consists of a motor which is assembled to various combinations of heads and fuzes to meet mission requirements. A fin retainer holds the fins in a retracted position until the rocket is launched. The contact disc, located on the fin retainer, and the nozzle plate are connected to the integral igniter circuit and provide for connection of the rocket to the launcher firing circuitry.

ROCKET MOTOR ASSEMBLY. The motor tube (figure 1-56) is made of seamless aluminum alloy tubing and is 32 inches long. The propellant used is an internal-burning grain ballistite. The external surface of the grain is covered to prevent the grain from burning on the outside. The burning rate of the propellant varies with temperature, from 2.92 seconds at -45.6 degrees C to 1.42 seconds at 54 degrees C. The rocket motor is ignited by airplane electrical power through an igniter. An electric squib ignites the mixture of black powder and magnesium powder contained in the igniter.

ROCKET NOZZLE/FIN ASSEMBLY. The nozzle/fin assembly (figure 1-56) attaches to the rear end of the motor tube, and consists basically of a nozzle plate, four nozzles, a fin actuating mechanism, four folding fins, and a fin retainer and contact disk. Gas pressure from the motor operates the piston and crosshead, pushing the heels of the fins and thereby causing the fins to open. The crosshead remains in its rearmost position, and is effective in locking the extended fins in their normal angular projection rearward against the force exerted by the airstream, even after loss of external pressure at motor burnout. The fins are shaped aluminum alloy plates, 6.5 inches long and 1.25 inches wide. When folded, they extend to the rear within the 2.75-inch diameter of the round. The forward end corners are cut out and doubled so that the fins will clear the nozzles when closed, and clear the exhaust blast when open.

Figure 1-55. 2.75-inch Folding Fin Aircraft Rocket (FFAR)

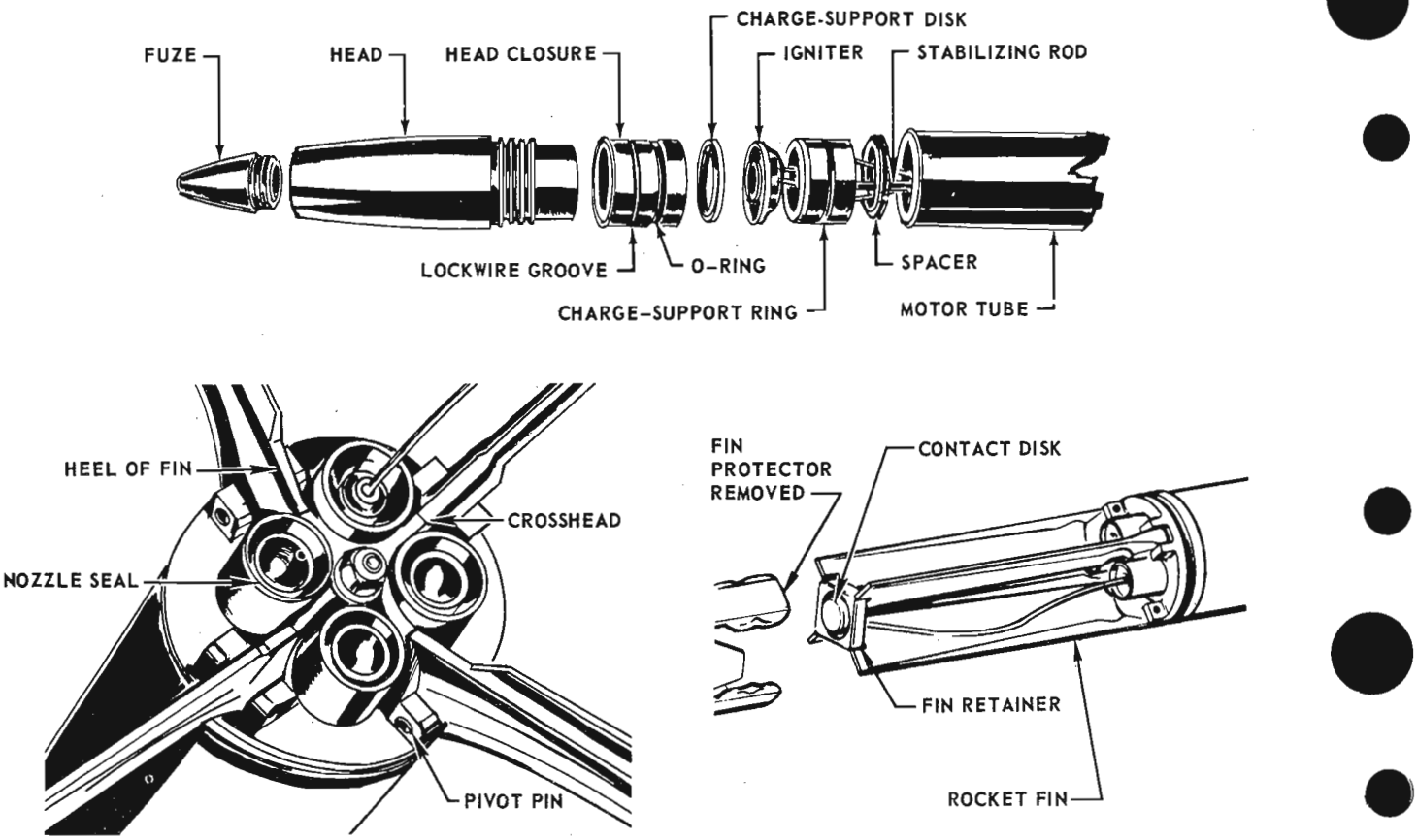


Figure 1-56. Rocket Assembly

ROCKET HEADS. The 2.75-inch FFAR will weigh 18.0 pounds when equipped with any of the following heads:

a. The MK-1 high-explosive (HE) head is 11.1 inches in length and weighs 6.74 pounds with the MK 176 or MK 178 fuze installed. The head is loaded with 1.4 pounds of HBX-1 high explosive for blast, fragmentation, mining, or demolition effects.

b. The MK-5 high-explosive antitank (HEAT) head has the same dimensions and weight as the HE head. The MK-5 head is constructed with a shaped charge for penetration of armored vehicles, tanks, and other resistant targets. It is loaded with 0.89 pound of composition B explosive. The inert head has the same configuration and carries an inert load of plaster and a dummy fuze.

c. The MK-61 practice head is identical in external configuration to the MK-1 and MK-5 heads and is used for practice runs. It carries an inert load of plaster and a dummy fuze.

When equipped with a WDU-4A/A head, the 1.75-inch FFAR will weigh 21.0 pounds. The WDU-4A/A warhead (figure 1-57) is a flechette (miniature steel dart) antipersonnel warhead. The WDU-4A/A warhead is 2.75 inches in diameter, 17.76 inches long, weighs 9.4 pounds, and contains a base fuze, ejecting charge, piston, 2200 20-grain flechettes, and an aerodynamic nose cone. The WDU-4A/A warhead is compatible with all 2.75-inch FFAR motors and launchers. The fuze is installed during assembly and is an integral part of the warhead. At launch, acceleration forces arm the fuze. At motor burnout (approximately 1.8 seconds after launch), an airburst is initiated by the deceleration forces which frees the spring loaded firing pin to ignite the M9 ejecting charge. The M9 ejecting charge generates a gas pressure against the pusher plate (piston) which transmits the pressure through the standby flechettes and to the shear pins on the nose cone. The shear pins are broken to allow the nose cone to be ejected, followed by the flechettes. The flechettes are packed tightly in the split sleeves with alternating flechettes pointing fore and aft. When the flechettes are ejected, aerodynamic forces cause the tail-forward flechettes to tumble and streamline; this weather-vaning causes dispersion. Slant range at launch is a factor in determining the slant range at rocket motor burnout, and therefore, is a critical factor in determining the dispersion and weapon effectiveness. Refer to the rocket launch tables for flechette warhead ballistics data. Refer to the Confidential supplement (T.O. 1F-100C(I)-34-1-1B) for the planning charts used to determine impact pattern size and optimum launch conditions.

The 2.75-inch FFAR will weigh 22.0 pounds when carrying either of the following heads:

a. The M151 special warhead has a peralite, malleable iron (PMI) case, threaded at the forward end for fuze attachment, and threaded at the aft end for attachment to the head closure of the motor assembly. This warhead is shipped with or without fuze. Composition B4 is the explosive filler. This round has antiricochet capabilities. It has a graze-sensitive and superquick-action fuze that has a cylindrical body with a conical nose section. The fuze arms by sustained acceleration. Length of the head without fuze is 13 inches.

b. The M156 white phosphorus (WP) head is identical in external configuration to the M151 head and is used for target spotting. The fuze is graze sensitive and has antiricochet capabilities.

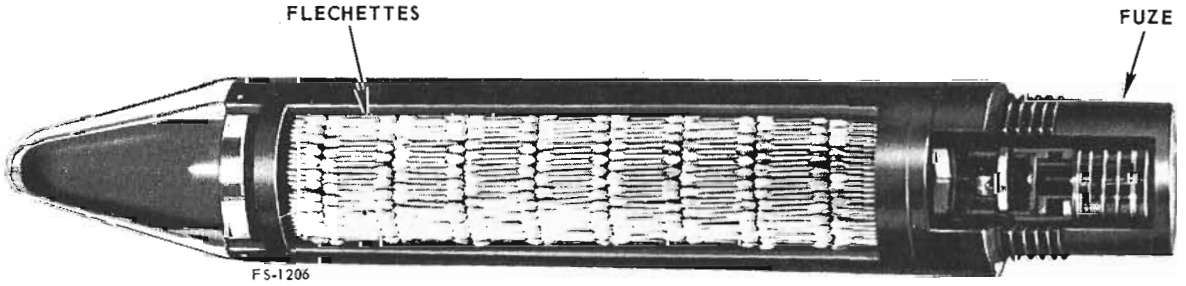


Figure 1-57. Rocket Head (Cutaway)

ROCKET FUZES. The MK 176 and MK 178 are cone-shaped steel-constructed point-detonating nose fuzes used only with the MK 1 high-explosive head. The MK 176 is a delay fuze, while the MK 178 is an instantaneous-action fuze. The MK 181 is a base-detonating nose fuze used only with the MK 5 high-explosive antitank head. These fuzes are detonator-safe and are armed by sustained acceleration of approximately 20 G. This insures that the rocket will travel at least 400 feet before the fuzes arm. The maximum distance for arming is approximatley 1,400 feet.

The flechette warhead fuze (figure 1-58) contains the same safe and arming mechanism as the MK 176 fuze, with the addition of a metal dowel press fitted into the rotor. The dowel prevents a spring-loaded setback piston from moving forward and releasing the spring-loaded firing pin. The firing pin is held in place by a steel locking ball which rests in a groove of the firing pin. The ball in turn is held in place by a steel spacer pin which rests against the spring-loaded setback piston. This acceleration-activated arming mechanism provides a minimum 500-foot airplane separation before the fuze arms.

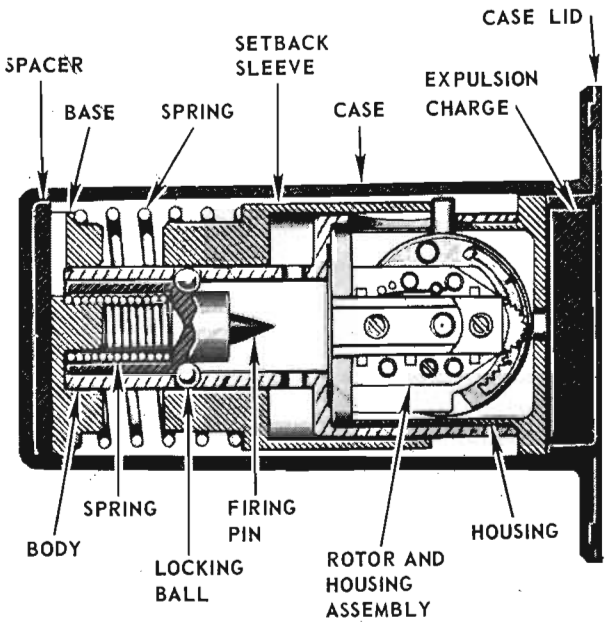


Figure 1-58. Flechette Warhead Fuze

Rocket Launchers. The 2.75-inch FFAR may be carried in any one of the launchers presently available for carriage on the F-100 airplane. These are the LAU-3, -32, -59, and LAU-68 designed for combat missions.

LAU-3A AND -3D/A ROCKET LAUNCHERS. The LAU-3A and LAU-3D/A launchers (figure 1-59) carries and launches nineteen 2.75-inch folding-fin aircraft rockets. Two launchers can be carried, one at each outboard station. Flight configuration consists of a loaded center section assembly with streamlined frangible fairings installed and locked onto the ends. Fairings are made of treated paper; at firing, the front fairing is shattered by the rocket impact. The rear fairing serves to channel rocket debris away from the undersurface of the wing; after firing, the launcher may be jettisoned from the airplane. The launcher center section is constructed of 19 paper tubes clustered and bonded together to form an integral part of the structure. It is also wrapped with a thin aluminum outer skin and has an exterior 14-inch suspension adaption system for Air Force pylons. Detent devices within the tubes restrain the rockets against normal flight loads and provide electrical contact to ignite the rockets. Contact fingers on the aft bulkhead provide a ground to complete the circuit through the rockets. Two receptacles on top of the center section provide for connection to the airplane rocket-firing circuitry. These receptacles are wired in parallel; therefore, only one of them is connected to the airplane. A shorting button is inserted into the other receptacle to provide a safety feature. (Later models also have a shorting pin.) The LAU-3A weighs 430 pounds loaded, is 94.6 inches long, and is 15.75 inches in diameter. The LAU-3D/A consists of an LAU-3A with fairings on both ends. It weighs 469 pounds loaded, 78 pounds empty.

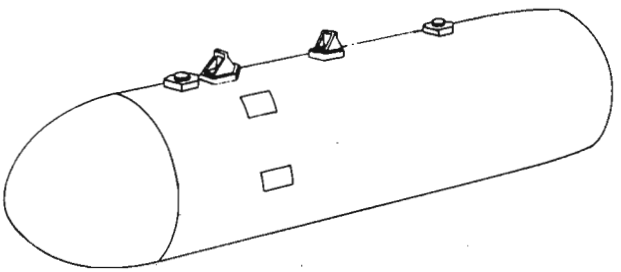


Figure 1-59. LAU-3A, D/A Rocket Launchers

On airplanes not changed by T.O. 1F-100-632, electrical power for the rocket ignition system is supplied to the launcher through the rocket selector switch. With the switch at SINGLES, the first activation of the bomb button causes the left launcher to fire, and the second activation fires the right launcher. With the switch at ALL, the right launcher fires 1/10 second after the left launcher commences firing. The pilot must hold the bomb button depressed for approximately 0.20 second to insure fire-out of all rockets. On airplanes changed by T.O. 1F-100D-632, electrical power for the rocket ignition system is supplied to the launcher through the armament selector switch and the appropriate station selector switch or switches. The rockets are fired, by pressing the bomb button, manually through the basic armament system or in selected quantities, intervals, and modes, through the automatic weapon release system (AWRS).

INTERVALOMETERS. An intervalometer, inserted into the rear lower corner of the launcher (figure 1-60), converts the airplane firing pulse into either a single or ripple-firing mode with a 1/100-second delay interval. Each firing pulse will fire two rockets from the launcher. The launcher will continue to fire the rockets in pairs until all have been fired.

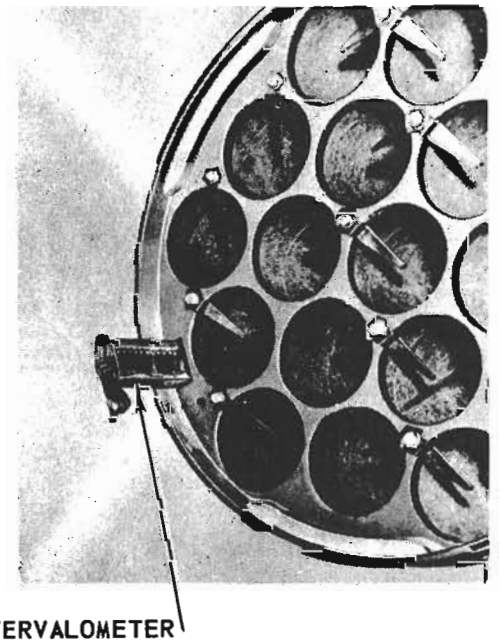


Figure 1-60. Intervalometer

LAU-32, LAU-59, AND LAU-68 ROCKET LAUNCHERS. The LAU-32, -59 and -68 are similar seven-tube 2.75-inch folding-fin aircraft rocket launchers (figure 1-61). The LAU-32 and LAU-59 are designed for continuous use. Flight configuration consists of a loaded center section assembly with streamlined fairings installed and locked onto the ends. The front fairing is made of treated paper; at firing, it is shattered by the rocket impact. The rear fairing is made either of treated paper, or, for repeated use, of metal. One of each of these types of launchers can be carried at the outboard stations. All of them can be jettisoned, if necessary. The LAU-32 and LAU-59 launchers each weigh approximately 183.5 pounds loaded and approximately 54.0 pounds empty. They are 67.10 inches long (with end fairings installed) and 9.8 inches in diameter. The LAU-68 launcher weighs 212 pounds loaded and 68 pounds unloaded. It is 71 inches long (with end fairings installed) and 9.8 inches in diameter. All of these launchers attach to the standard 14-inch spacing double-lug bomb rack. The main center section contains all electrical circuits and an intervalometer. Detent devices within the tubes restrain the rockets against normal flight loads and provide electrical contact to ignite the rockets.

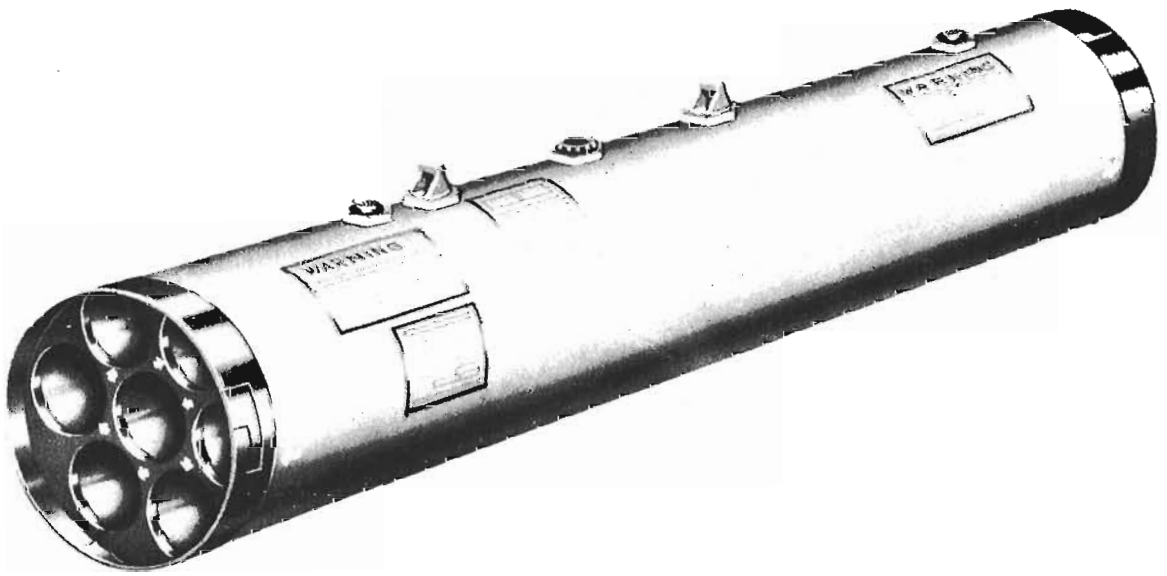


Figure 1-61. LAU-32, -59, and -68 Rocket Launchers

Arming-Wire Installations. There are several arming-wire installations for various fuze configurations. These are described in the paragraphs following the descriptive material for the weapon concerned.

CAUTION

Improper installation of arming-wire assemblies can result in damage to the airplane due to whipping action of the arming wires after release of the bomb.

- Arming wires shall be checked for kinks and burrs.

AFTER BOMB LOADING. After the bomb is uploaded, the respective arming-wire swivel loops are inserted into the pylon nose-arming and tail-arming solenoids located between the pylon shackles. (See figure 1-62.) The free ends of the arming wires are then attached or threaded through safety devices in the fuze, thus maintaining the fuze in a safe (unarmed) condition. Clips are placed over the ends of the arming wires to prevent accidental slippage out of the safety device before release.

IN-FLIGHT OPERATION. The bomb arming switch controls the arming solenoids in the pylon, to determine whether the arming-wire swivel loops will be released with the weapon or retained with the pylon. When a bomb is released for effect (NOSE & TAIL selected), the arming-wire swivel loops are retained by the pylon solenoids. As the bomb is ejected from the pylon (low-blow, 16 feet per second ejection force), the arming wires are pulled from the fuzes and through the swivel loops, remaining with the bomb. The fuzes are then free to become armed or to operate. If the NOSE option is selected, the nose fuze functions as described. The tail fuze wire, however, remains with the bomb. In this case, the tail fuze swivel loop is released from the pylon solenoid. If the TAIL option is selected, the tail fuze functions as described. The nose fuze wire, however, remains with the bomb. In this case, the nose fuze swivel loop is released from the pylon solenoid. If the bomb is released in the safe condition (arming switch in the safe position), the arming-wire swivel loops are released from the pylon arming solenoids, the arming wires remain in the fuze safety devices, and the fuzes cannot function. Without fuze operation, the bomb is usually a dud.

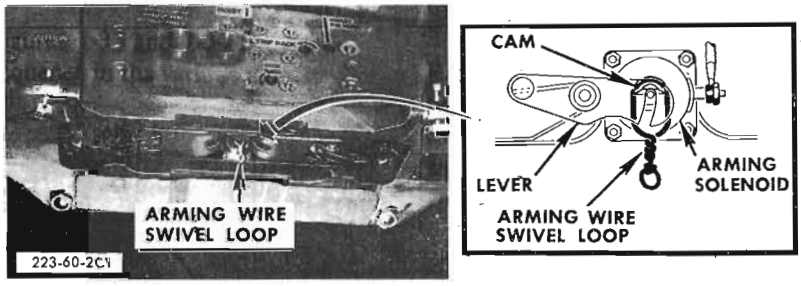


Figure 1-62. Arming-Wire Installations

M65A1-General Purpose Bomb. The M-65A1 (figure 1-62) is a general purpose bomb normally used for demolition operations. Each bomb has a cylindrical metal body with an ogival nose and a tapered aft section. The bombs are fitted with an M-129 conical fin assembly when used with high-performance airplanes. The fin assembly improves the aerodynamic performance of the bomb and permits greater accuracy in bombing operations.

The loaded M-65A1 weighs 1,205 pounds. It is 91 inches long, 18.8 inches in diameter, and has a fin span of 15.4 inches.

CAUTION

The bomb fin assembly shall be mounted in the X configuration.

Antirotational devices on the bombs prevent the inadvertent rotation of the fin assembly during flight. The bomb has both single and double suspension lugs welded to the bomb case. The double suspension lugs are spaced 14 inches apart. The bomb body may be filled with one of several types of explosives. For fighter operations, the explosive Tritonal is normally used; however, the bombs may also be loaded with TNT, composition B, or Amotol high explosive. When loaded with Tritonal, the explosive weight is 278 pounds. A fundamental characteristic of the explosive charge in the bomb is its relative insensitivity to ordinary shock and heat incident to loading, transporting, handling, and storing. The bomb is adapted for use with pylons having forced-ejection systems. It is also designed for use with both a nose and a tail fuze. Other components used are arming wires and adapter boosters. The adapter boosters, issued as separate units, serve to fill the 3-inch diameter fuze wells in the bomb body, to accommodate the body of the fuzes, and to contain a booster charge that amplifies and relays the detonation wave from the fuze to ensure proper detonation of the bursting charge (high explosive).

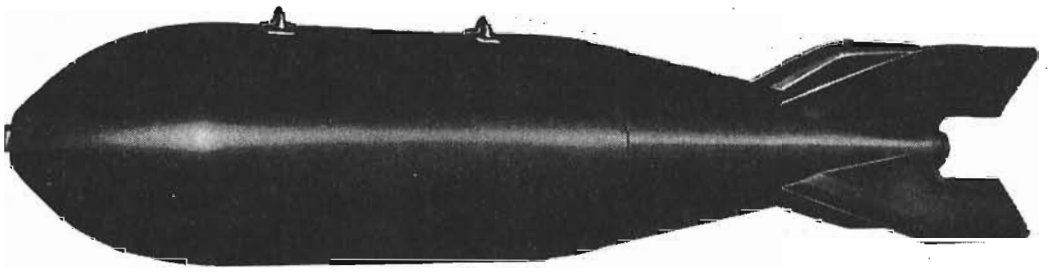


Figure 1-63. M-65A1 General Purpose Bomb

M117 Series General Purpose Bomb. The M117 is a general-purpose bomb (figure 1-64) normally used for demolition operations. The bomb has a cylindrical metal body with an ogival nose and a tapered aft section to which a conical fin assembly is attached. The M117 has an external contour streamlined for low air resistance in the transonic and supersonic ranges. The elongated conical fin assembly gives it an overall shape longer and thinner than that of other general-purpose bombs of comparable weight. The M117 weighs 823 pounds, is 90.0 inches long, is 16 inches in diameter, and has a fin span of 22.4 inches.

The basic structural material of the bomb is steel. Provisions for either single- or double-lug suspension are on top of the bomb. The double suspension lugs are spaced 14 inches apart. The bomb body is filled with 386 pounds of Tritonal high explosive or 379 pounds Minol 2 high explosive. A fundamental characteristic of the explosive used is its relative insensitivity to ordinary shock and heat incident to loading, handling, and transporting. The bomb is adapted for use with pylons having forced ejection systems. It is also designed for use with both a nose fuze and tail fuze, to insure reliability of functioning and to cause the desired effect, which may be blast, mining, or fragmentation. The conical fin assembly also improves the aerodynamic performance of the bomb during flight and permits greater accuracy in bombing operations. The MAU-91( ) high-drag fin provides optional decelerated operation of the bomb for high-speed, low-altitude bombing. Antirotational devices on the bomb prevent inadvertent rotation of the fin assembly during flight. The fin assembly consists of an elongated fin cone and four identical streamlined blades assembled perpendicular to the cone.

CAUTION

The fin assembly shall be mounted in the X configuration.

The fin cone contains four access holes. Two access holes, of a modified oval shape approximately 6.5 inches long, provide for installation of the bomb tail fuze and attachment of an ATU-35/B drive assembly when an M905 bomb tail fuze is installed. A closing cover is provided for each access hole. An additional cover with a cutout is supplied to replace the solid cover when a tail fuze requiring the drive assembly is used.

Typical fuze installations for the M117 are shown in figure 1-65.

Other components used are arming wires and adapter boosters. The arming wires are threaded through safety devices in the fuze, thus maintaining the fuze in a safe (unarmed) condition until release. The adapter-boosters, issued as separate units, serve to fill the 3-inch-diameter fuze wells, to accommodate the body of the fuzes, and to contain a booster charge to insure proper detonation of the high-explosive charge.

For arming and release information, refer to Section II – Normal Aircrew Procedures.

Operation of the bomb commences upon release, when the arming wires are withdrawn, permitting the fuzes to arm. Upon impact with the target, one or both fuzes operate, igniting the explosive train, which relays and amplifies the blast to detonate the bursting charge of the bomb. If either fuze (nose or tail) malfunctions, the other will cause detonation of the bomb.

KMU-342/B MUNITION. The KMU-342/B munition consists of the M-117 bomb body, the KMU-342/B guidance kit, and the FMU-26/B fuze. It weighs 895 lbs.; it has a length of 106.3 inches and a fin span of 36 inches.

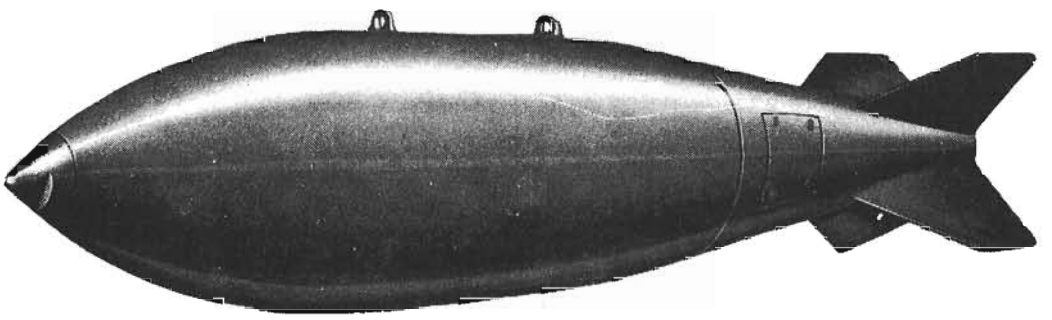
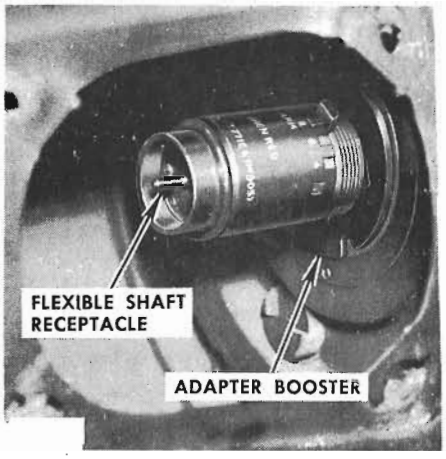
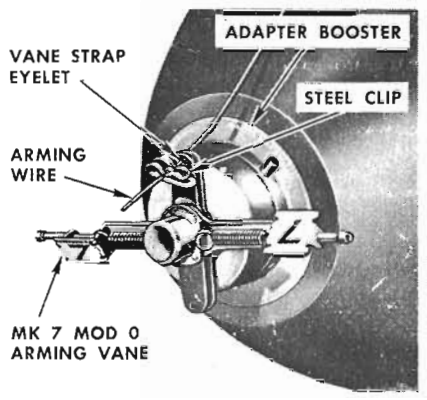
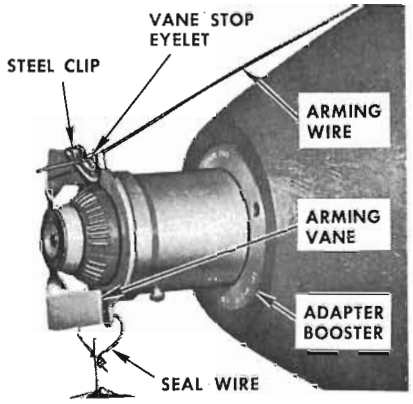
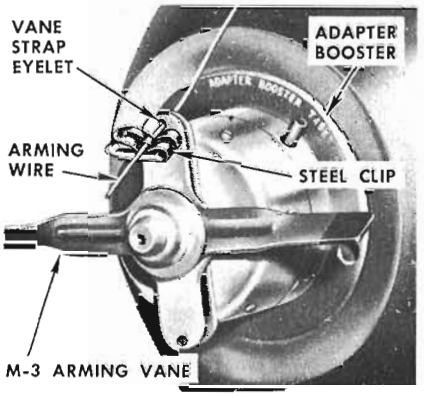


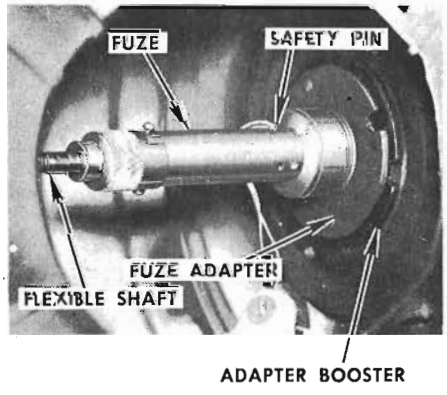
Figure 1-64. M117 Series General-Purpose Bomb











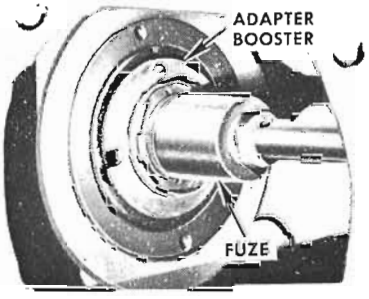


Figure 1-65. M117 Bomb and MC-1 Bomb Fuze Installation

ARMING-WIRE INSTALLATIONS FOR M117 BOMBS. The following applies to bombs fuzed with an M904 series nose fuze: One arming wire, with swivel loop, shall be secured to the rear suspension lug and routed through the forward suspension lug. The other arming wire, with swivel loop, shall be secured to the forward suspension lug and routed through the rear suspension lug. (See A, figure 1-66.)

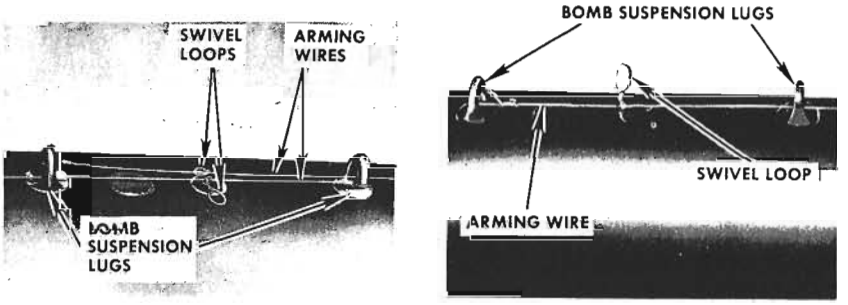


Figure 1-66. Arming-Wire Installations for M117 Bombs

M117 General-Purpose Bomb Retarded. The M117 general-purpose Retarded bomb (figure 1-67) is a standard M117 bomb body with a high drag MAU-91( ) fin assembly attached. The fins provide the airplane with a high-speed and a low-altitude bombing capability. These fins replace the standard fin assemblies and present a low-drag configuration when in the closed position. The bombs are aerodynamically stable when released in the closed configuration and can be used in the same manner as a standard M117 bomb. When the retarding fin release band assembly is activated, the assembly expands into four dive-brake-type flaps which stabilize and decelerate the bomb by creating high aerodynamic drag. The M117 retarded bomb weighs 880 pounds, is 89.4 inches long, and is 16 inches in diameter. The fin assembly is 38 inches long, weighs 123 pounds, and has a fin span of 22.4 inches when closed and 83.5 inches fully opened. The bomb is carried in the low-drag configuration and is delivered in either the low-drag or high-drag configuration. Refer to Figure 1-69 for correct setting of the bomb arming switch. In the low-drag configuration, the fin assembly drag plates are held closed by a release band with a latch connected by a lanyard to one of the arming solenoids of the airplane. When the solenoid is activated, the lanyard will pull the release band latch, allowing the drag plates to deploy. A leaf spring under each drag plate, and impinging airloads, snap the plates open to a position approximately perpendicular to the airstream, thus providing maximum drag area and stability. Certain fuze configurations are activated by the action of the fins opening. These fuzes will not arm if the fins fail to deploy.

The release sequence for the M117 (R) bombs are as follows:

(1) Outboard-Pairs or Singles(F-100C and F, pairs only)
(2) Inboard-Pairs or Singles
(3) Salvo (four stores) – Low Drag Only.

WARNING

The M117 Retarded Bomb (high drag) will be released from the inboard stations only in SINGLES RELEASE MODE. M117(R) bombs released in pairs from the inboard stations may collide in flight resulting in aircraft damage.

NOTE

After the M117 bomb with the MAU-91( ) retarder attached has been suspended on the airplane, the pilot should check the arming lanyards to insure that they are properly routed and are not tangled.

The following warning applies to the FMU-54/B fuze when used on the M117GP retarded bomb.

WARNING

To assure safe escape in the event of premature air-burst detonation, the FMU-54/B arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 3.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

ARMING-WIRE INSTALLATION FOR M117 BOMB (RETARDED). The arming-wire installation for the M117 (retarded) bomb employs three lanyards. Refer to figure 1-69 for pictorial details of the four possibilities of arming wire installations and fuze combinations. The bomb arming switch must be correctly positioned for the desired delivery mode.

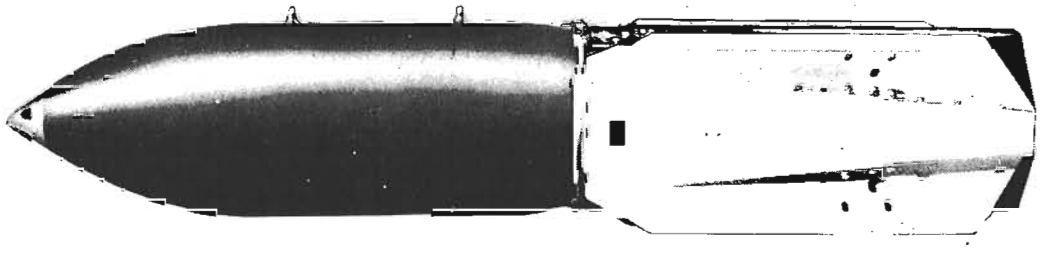


Figure 1-67. M117 General Purpose Bomb – Retarded

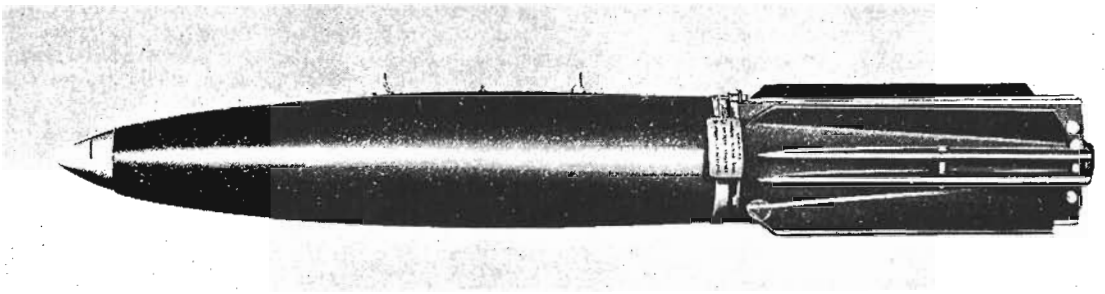


Figure 1-69. MK-82 Snakeye I Bomb

MK-82 Snakeye I Bomb. This general-purpose bomb (figure 1-69) may be utilized in either a low-drag release or high-drag release configuration. Total weight of the MK-82 Snakeye I bomb is 560 pounds, of which about 192 pounds is Tritonal explosive. The fin assembly is MK-15 Mod 1. The MK-82 Snakeye I dimensions are: overall length, 89.5 inches; diameter of body, 10.8 inches; fin span closed, 15.1 inches; and fin span open, 65.3 inches. A 3-inch-wide yellow stripe around the nose signifies high-explosive filling. Present configuration of this bomb permits installation of an M904E2 mechanical-impact nose fuze with a T45E1 adapter booster, and the appropriate M-9 primer delay for nose fuzing with impact function. Arming time for this fuze is 2.4 to 2.8 seconds.

NOTE

The M904-E2 nose fuzes, lot number LS-23-1, LS-24-1, LS-24-4, LS-23-9, LS-31-3, and LS-24-3A, shall not be used in the 2-second settings. The 4- through 18-second settings are within tolerance.

The bomb has standard 14-inch lug suspension and may be carried on type I or type III pylons, as well as on all three racks of each TER. The bombs are released under low-blow ejection regardless of wing station or pylon used.

Bombs can be released in either the low-drag configuration (fins remain closed after bomb release) or high-drag configuration (fins extend after bomb release). Bomb arming is selected before release, and normal bomb release circuitry is used to release the bombs. If the bombs are jettisoned in an emergency, they are released safe and the fins remain closed.

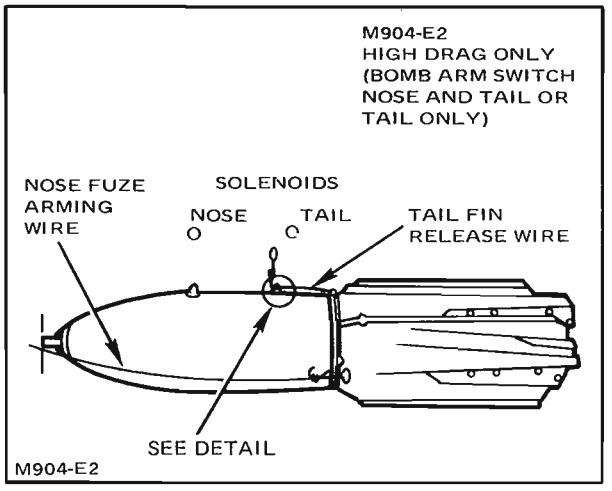
ARMING-WIRE INSTALLATION FOR MK-82 SNAKEYE I BOMB. The arming wire installation for the MK-82 Snakeye I bomb employs three lanyards and five combinations of routing systems and fuzes. Refer to figure 1-69 for pictorial details. The correct selection of energized arming solenoids must be selected for the delivery mode desired.

M117(R) AND MK-82 (SNAKEYE I) INFLIGHT OPTION FOR HIGH OR LOW DRAG DELIVERY. These bombs can be released in either high or low drag configuration at the option of the pilot provided arming wire routing is accomplished during loading to provide this option. With the required arming wire routing, the selection is made through the bomb arm switch as follows:

a. NOSE – the weapon will be released in a low drag configuration.
b. TAIL – the weapon will be released in a high drag configuration.
c. NOSE–TAIL– the weapon will be released in the high drag configuration with redundant fuzing, provided time of fall is over 6.6 seconds. If the time of fall is less than 6.6 seconds, only FMU-54 fuze arming is available.

WARNING

Since certain mechanical and human errors inherent with this type of delivery option can result in hazardous or degraded reliability situations, the operational commander should consider the following notes and warning which point out the possibility of self-inflicted damage, injury to friendly forces, single fuze reliability, and degraded delivery accuracy before approving this option for operational use.



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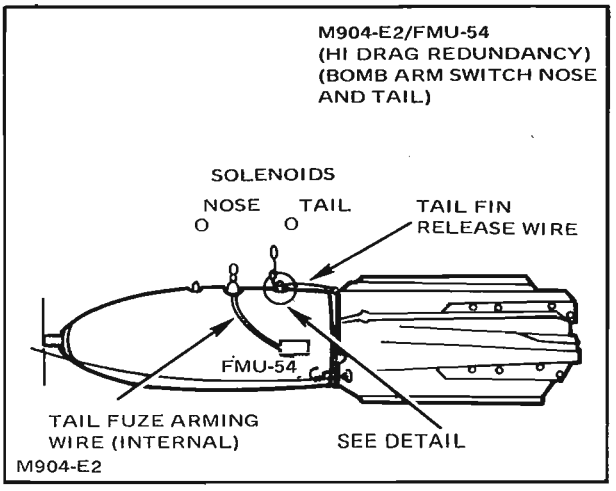

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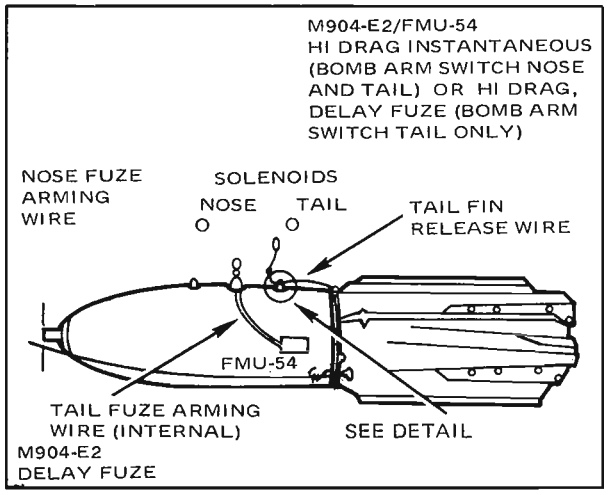

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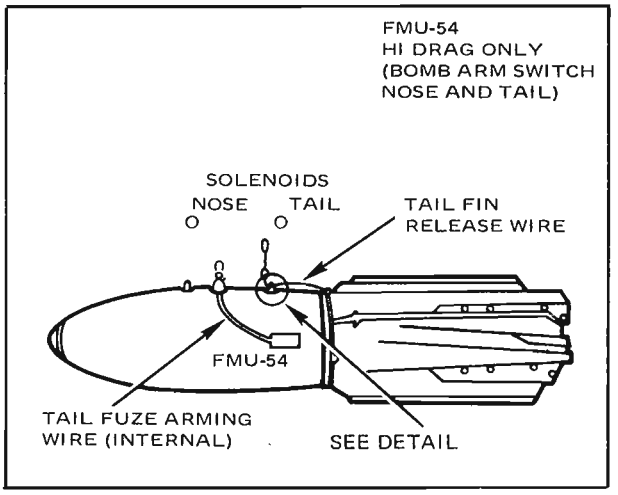

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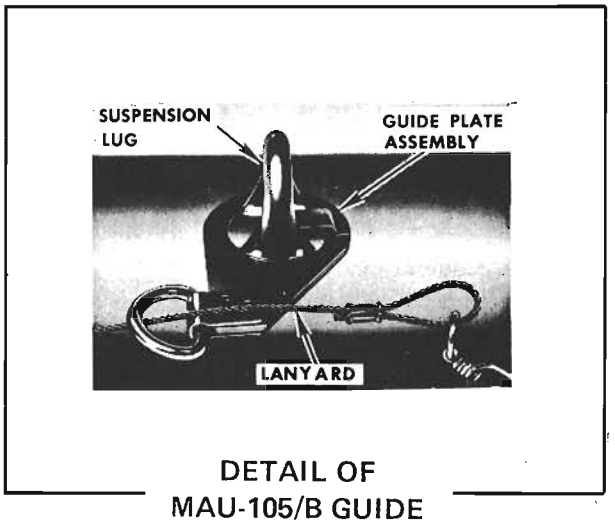


Figure 1-70 . Typical Arming Wire Installations, M117 Bomb (retarded) and MK-82 Snakeye Bomb. For specific arming wire/fuzing configuration see 1F-100C-33-1-2.

NOTE

The minimum M904 E2/E3 nose fuze arming delay setting for this optional mode of delivery shall be 6.0 seconds. Under certain conditions, a four second setting is permissible. See warning below.

WARNING

Under combat conditions, where a 6-second nose fuze arming delay setting may be inconsistent with operational requirements, a four second setting may be used subject to the following restrictions:

a. For planned high drag dive releases, the pickle altitude must not exceed 1000 feet AGL.
b. For planned high drag dive toss releases, the pickle altitude must not exceed 1000 feet AGL.
c. For planned level release of high drag weapons, the release altitude must not exceed 250 feet AGL.

The above warning does not apply if the high/low configured MK-82 (Snakeye) is to be delivered above the minimum release altitudes that are required for safe escape for low-drag MK-82 bombs.

WARNING

When the MK-82 (Snakeye I) or M117(R) bombs are configured for inflight selectivity for high/low drag releases the minimum nose fuze setting is 6.0 seconds for the M904E2 or M904E3 fuze; the minimum tail fuze setting for the FMU-54 fuze is 2.5 seconds. With current arming time tolerances, the minimum bomb time of fall to provide time for the fuzes to arm is 6.6 seconds for the noze fuzes and 2.8 seconds for the tail fuzes (high drag arming only).

- With this in-flight option of high/low drag selection, strict adherance to the prescribed cockpit switchology is mandatory. If the AC inadvertently selects high drag, or experiences an arming solenoid malfunction when the intent is to release a low drag bomb, a fully armed high drag bomb would impact considerably short of the intended aimpoint. If friendlies are in the immediate area, this could result in disastrous consequences. Conversely, if the AC inadvertently selects low drag, or experiences an arming solenoid malfunction when the intent is to release a high drag bomb, during close-in attack conditions, the result (if the bomb time of fall is less than 6.6 seconds) would be an unarmed bomb with an initial impact considerably downrange of the intended impact point. This could result in disastrous consequences if friendlies are in the area; particularly if the bomb detonates or richochetes and then detonates. If the bomb time of fall exceeds 6.6 seconds in this case, a fully armed bomb would impact considerably downrange from the intended impact point.

- There is also a possibility of the delivery aircraft suffering self-inflicted fragment damage if an intended high drag bomb releases low drag during a close-in attack condition, and for some reason detonated at initial impact. To provide an additional safety margin in this event, the pilot should execute a 4-G pullup or a 4–G,60 banked escape maneuver immediately after release.

- Minimum release altitudes with respect to fragment envelope clearance should be observed even if the bomb is released

SAFE. This would prevent the aircrew in the event of an arming wire hang-up, solenoid malfunction, etc., resulting in an arming wire being extracted and the bomb becoming fully armed.

- The use of the pilot option wiring scheme will result in increased duds as the hardware limits can be exceeded.
- The use of low drag high altitude level releases is not recommended due to possible bomb instability problems which will result in gross delivery inaccuracies. Errors of hundreds of yards can result.
- The use of low drag high speed dive bomb releases can result in bomb instabilities and slight inaccuracies. Errors of tens of yards can result.

NOTE

If the high drag bombs are configured to exclude the in-flight option, a 2.0 second nose fuze arming delay setting may be used. Prior to delivery the bomb arm switch shall be set to the NOSE AND TAIL position. This will result in instantaneous and redundant fuze action. If a delay element is installed in the nose fuze, select only the TAIL position and a delayed nose fuze action will be obtained. This is advantageous where high canopied targets are to be hit.

- The MK-15 MOD 0,1,2 fin may be used if the tail fuze and the fin arming wire are omitted.
- Use MK-15 MOD 3,3A or 4 only for delivery in high drag mode.

MK-81, MK-82, and MK-83 General-Purpose Bombs. The MK-81, MK-82, and MK-83 bombs are similar in design, operation, and application. The major differences are in weight and dimensions. MK-81, MK-82, and MK-83 general-purpose, low-drag bombs (figure 1-71) have a slender cylindrical body with a sharply pointed nose. A conical-type fin assembly is attached to the aft end of the bomb. The bomb is designed for use with a nose and a tail fuze, and uses mechanical-type fuzes. The loaded MK-81 weighs 260 pounds, is 74 inches long, is 9 inches in diameter, and has a fin span of 12.6 inches. The loaded MK-82 weighs 530 pounds, is 86.9 inches long, is 10.75 inches in diameter, and has a fin span of 15.1 inches. The loaded MK-83 weighs 985 pounds, is 119 inches long, is 14 inches in diameter, and has a fin span of 19.6 inches.

ARMING-WIRE INSTALLATIONS FOR MK-81, MK-82, MK-83 BOMBS. Arming-wire installation for bombs with the M188 or M914 nose fuze installed shall be accomplished after loading.

The following applies to bombs fuzed with an M904 series nose fuze: One arming wire, with swivel loop, shall be secured to the rear suspension lug and routed through the forward suspension lug. The other arming wire, with swivel loop, shall be secured to the forward suspension lug and routed through the rear suspension lug. (See figure 1-72.)

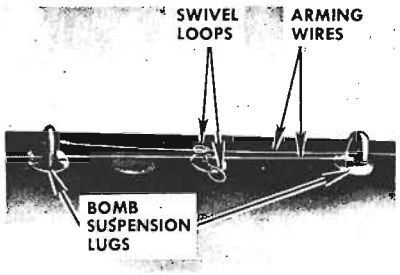


Figure 1-72. Arming-Wire Installations for MK-81, MK-82, MK-83 Bombs

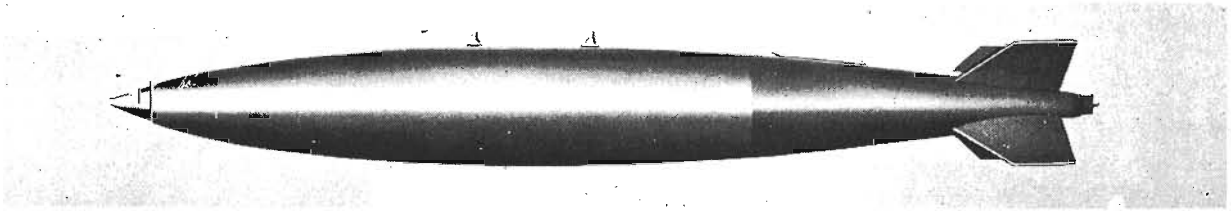


Figure 1-71. MK-81, MK-82, MK-83 General-Purpose Bombs

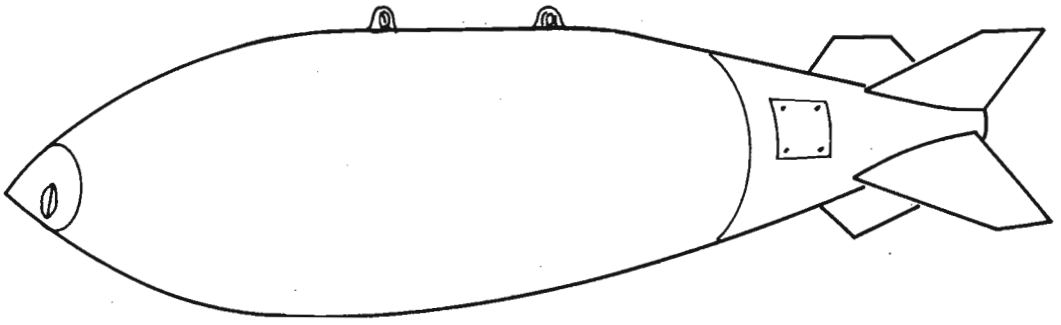


Figure 1-74. MC-1 Gas Bomb

MC-1 Gas Bomb. The MC-1 (figure 1-74) is a nonpersistent gas bomb designed by conversion and modification of the M117 general-purpose bomb. The bomb has a cylindrical metal body with an ogival nose and a tapered aft section to which a conical fin assembly is attached. The basic structural material of the bomb is steel. The bomb body is filled with 24 gallons (220 pounds) of gas bomb agent. The filler tube is permanently welded shut at the time filling is accomplished. Although provisions for either single- or double-lug suspension are provided at the top of the bomb, only the double-suspension lugs can be used on this bomb. The double suspension lugs are spaced 14 inches apart. The bomb is adapted for use with pylons having forced-ejection systems. The bomb is designed for use with both a nose fuze and a tail fuze. A hollow burster tube runs through the center of the bomb and connects the nose and tail cavities. Fuze wells are installed at both ends of the tube to accommodate nose and tail fuzes. Before loading, an M32 burster charge containing 15 pounds of composition B explosive is installed in the tube. The MC-1 weighs 725 pounds loaded, is 89.4 inches long, is 16 inches in diameter, and has a fin span of 22.38 inches.

The M131 or MAU-103A/B fin assembly on the bomb improves the aerodynamic performance of the bomb during flight and permits greater accuracy in bombing operations.

CAUTION

The fin assembly shall be mounted in the X configuration.

Antirotational devices on the bomb prevent inadvertent rotation of the fin assembly during flight. The fin assembly consists of an elongated fin cone and four identical streamlined blades perpendicular to the fin cone. The fin cone contains four access holes. Two access holes, of a modified oval shape approximately 6.5 inches long, provide for installation of the bomb tail fuze and attachment of an ATU-35/B drive assembly when an M905 bomb tail fuze is used. Two smaller holes are for attachment of an arming head assembly when an M190 bomb tail fuze is utilized. A closing cover is provided for each access hole. An additional cover with a cutout is supplied to replace the solid cover when a tail fuze requiring drive assembly is used. Of the authorized fuzes, any nose fuze (and components) may be used with any tail fuze (and components).

NOTE

Regardless of the fuze used, all will be set for instantaneous or nondelay functioning.

Other components used are arming wires and adapter-boosters. The arming wires are threaded through safety devices in the fuze, thus maintaining the fuze in a safe (unarmed) condition until release. The adapter-boosters, issued as separate units, serve to fill the 3-inch diameter fuze wells, to accommodate the body of the fuzes, and to contain a booster charge that insures proper operation of the burster charge.

For arming and release information, refer to Section II – Normal Aircrew Procedures.

Operation of the bomb commences when it is released and the arming wires are withdrawn. This permits the fuze arming vanes to rotate in the airstream. After the required number of revolutions or number of seconds, the fuzes are armed. When the bomb impacts, the fuzes function, causing the burster to detonate. The detonation of the burster ruptures the bomb body and disperses the filling as tiny droplets of liquid that quickly evaporate to a gas.

Typical fuze installations (except M906) for the MC-1 gas bomb are identical to those for the M117 GP bomb. (See figure 1-65.)

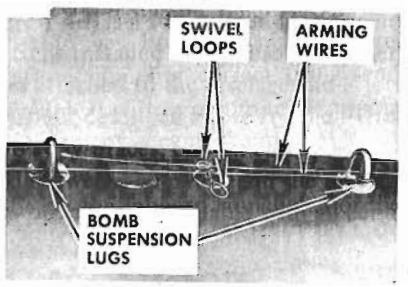


Figure 1-75. Arming-Wire Installation for MC-1 Bomb

ARMING-WIRE INSTALLATION FOR MC-1 BOMB. One arming wire, with swivel loop, shall be secured to the rear suspension lug and routed through the forward suspension lug. The other arming wire, with swivel loop, shall be secured to the forward suspension lug and routed through the rear suspension lug. (See figure 1-75.)

M129E1 Leaflet Bomb. The M129E1 (figure 1-76) is a leaflet bomb for delivery and distribution of letters, posters, and other leaflet-type materials. The bomb has a cylindrical body with an ogival nose and a tapered aft section. It is constructed of fiber glass and has an external configuration similar to that of the M117 GP bomb. The bomb body is split longitudinally into two sections held together by four latches on each side. The bomb is provided with steel suspension lugs spaced 14 inches apart, inserted in the top of the bomb. A steel reinforcing plate below the suspension lugs is added (M129E1) for forced ejection from the aircraft pylon. The M148 conical fin assembly consists of four Fiberglas sections, glued and riveted together to form a cone about 20 inches long. Four fin blades approximately 23 inches long are attached to the cone. The fin assembly is attached to the bomb, with eight dzus fasteners. The M129E1 weighs 200 pounds loaded (weight varies with the number of leaflets), is 90 inches long, is 16 inches in diameter, and has a fin span of 22.78 inches.

CAUTION

The fin assembly shall be mounted in the X configurations.

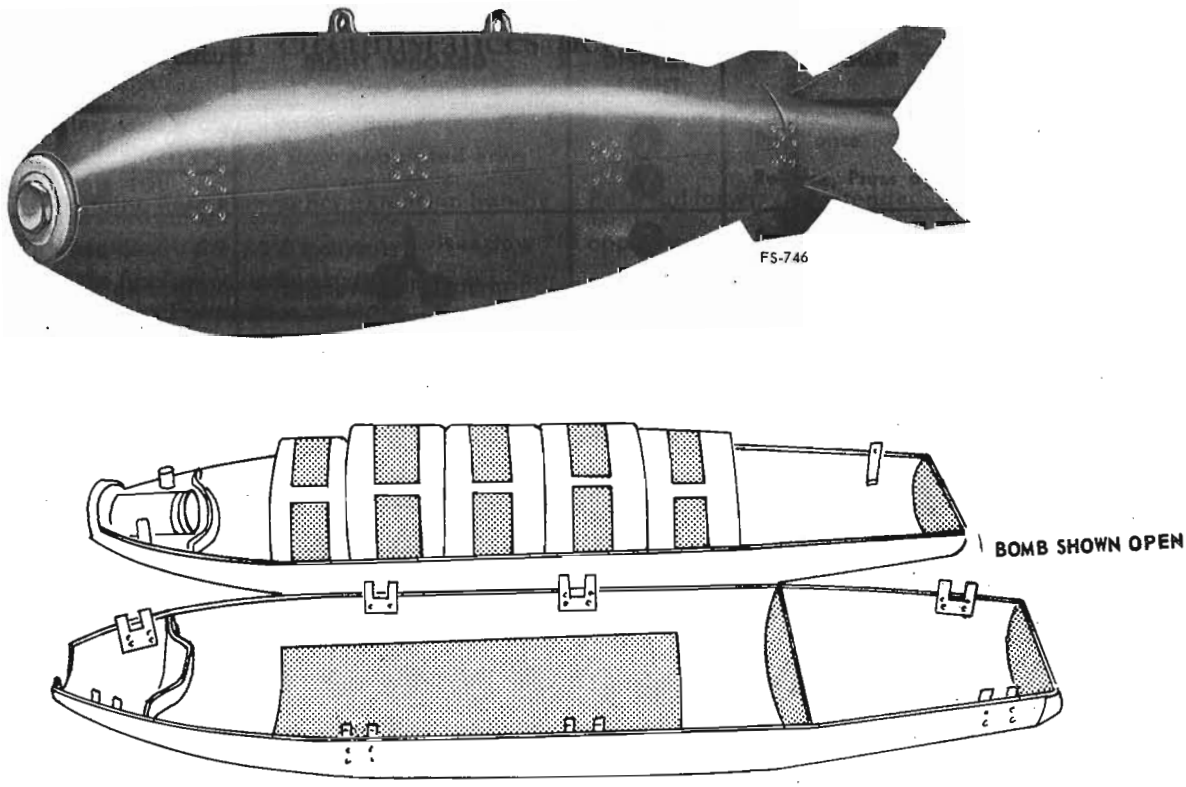


Figure 1-76. M129E1 Leaflet Bomb

The fuze well, in the nose of the bomb body, will accommodate a mechanical time fuze designed for air operation. No tail fuze is provided for the M129E1 bomb.

Other components include an arming wire, an adapter-booster assembly, and a detonating cord. The arming wire is threaded through the fuze safety device, thus maintaining the fuze in a safe (unarmed) condition until release. The adapter-booster (figure 1-77) accommodates the fuze body and maintains the detonating cord in the proper position. The detonating cord is used to effect separation of the two bomb body sections.

For arming and release information, refer to Section II – Normal Aircrew Procedures. Operation of the bomb occurs when the fuze functions a predetermined number of seconds after release. Functioning of the fuze causes the booster to ignite and detonate the 12-foot length of detonating cord. The cord is inserted through the adapter-booster and then around the entire bomb at the longitudinal split. Detonation of the cord separates the two body sections, detaches the fins, and allows the leaflets to be released and scattered by the relative wind. If the nose fuze fails to function, the bomb will disintegrate upon impact.

Typical fuze installation for the M129E1 is shown in figure 1- .

BLU-31/B Demolition Bomb. The BLU-31/B (figure 1-78) is an aerially-dropped, high explosive bomb. It is bluff-shaped for ground impact terminal characteristics which allows the bomb to be implanted as a mine. The case is constructed of heavy steel and is loaded with approximately 250 pounds of tritonal explosive. Double suspension lugs, spaced 14 inches apart, are installed. The bomb is adapted for use with pylons having forced-ejection systems. A MAU-93/B conical fin assembly stabilizes the bomb in flight for greater accuracy.

CAUTION

The fin assembly shall be mounted in the X configuration

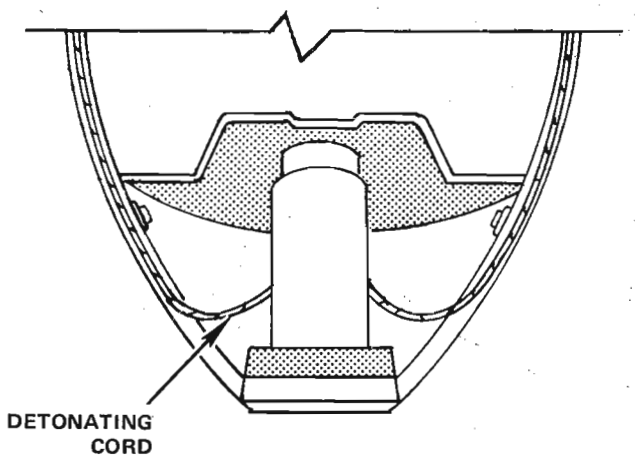


Figure 1-77. Adapter Booster M129E1 Leaflet Bomb

The bomb weighs 766 pounds loaded, is 95.6 inches long, with FMU 30/B nose fuze, is 11.25 inches in diameter, and has a fin span of 15.06 inches.

For arming and release information, refer to Section II – Normal Aircrew Procedures.

The FMU-30/B fuzed BLU-31/B demolition bombs have been successfully tested for impact velocities up to 900 ft/sec. Release conditions which result in impact velocities of 900 ft/sec or less should be selected during mission planning.

WARNING

When the FMU-30/B fuze is used with the BLU-31/B demolition bomb, minimum release altitudes which will provide safe escape from bomb fragments for instantaneous or contact bursts should be selected. This is required to protect the aircraft and aircrew in the event of a premature bomb detonation at initial impact.

- For the BLU-31/B bomb shape, the trajectory angle at impact should be in excess of 15 degrees to preclude ricochet.

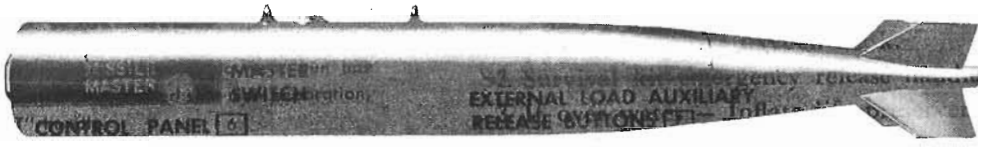


Figure 1-78. BLU-31/B Demolition Bomb

BLU-1, BLU-27, and BLU-32 Fire Bombs.

BLU-1( ) FIRE BOMB. The BLU-1( ) fire bomb (figure 1-79) is an incendiary air munition filled with thickened fuel, for external carriage on high-performance airplanes with forced-ejection release systems. The bomb has a cylindrical body with a tapered nose and a tail that may or may not be equipped with fins. The basic structural material is aluminum, with a reinforced area below the lugs for sway bracing and full-power ejection. Steel suspension lugs, spaced 14 inches apart, are inserted in the top of the bomb. An initiator cavity is located between the suspension lugs. The BLU-1( ) is adapted for use with both nose and tail fuzes and igniters. An igniter cavity, for the igniter/fuze assembly, is located at each end of the bomb beneath the removable nose and tail end caps. Electrical cables, internally installed in the bomb, provide for electrical connection of the initiator and the igniter fuzes. The AN/M23A1 igniter and the FMU-7/B, -7A/B or -7B/B electrical fuze are used with the BLU-1( ) fire bomb. The BLU-1( ) weighs 697 pounds filled and without fins (712 pounds filled and finned), is 130 inches long, and is 18.5 inches in diameter.

NOTE

Early production fuze systems have an arming delay that prevents arming when the bomb is released from an altitude of 50 feet or less. The arming delay of later FMU-7/B and the FMU-7A/B and -7B/B fuze systems is shortened to enable the fuze system to arm the bomb before impact when released from an altitude of 30 feet or greater.

For arming and release information, refer to Section II – Normal Aircrew Procedures.

Operation of the bomb commences as it is force-ejected from the pylon, extracting the arming lanyard from the initiator. This permits a firing pin to fire a thermal battery and electrically arm the fuze. Upon tank impact, the fuzes function bursting the igniter. White phosphorus, from the igniter, causes immediate ignition of the splattered fuel from the ruptured tank.

The BLU-1( ) finned or unfinned fire bombs will be released from the outboard stations in the low blow pylon release mode. The BLU-1( ) finned or unfinned fire bombs may be released from the inboard stations in either low-blow or high-blow release mode when type IB pylon is used. Release from other than type IB pylon from the inboard stations will be in the high blow release mode. Typical fuze installation for the BLU-1( ) is shown in figure 1- .

BLU-27 FIRE BOMB. The BLU-27 fire bomb (figure 1-79) is an incendiary air munition filled with napalm B. It is shipped preassembled and prefilled, and is designed for carriage with forced-ejection release systems. The bomb has a cylindrical body with a tapered nose, and a tail that may or may not be equipped with fins. The basic structural material is aluminum with a reinforced area below the lugs for sway bracing and full-power ejection. Steel suspension lugs, spaced 14 inches apart, are inserted in the top of the bomb. An initiator cavity is located between the suspension lugs. The BLU-27 is adapted for use with both nose and tail fuzes and igniters. An igniter cavity, for the igniter/fuze assembly, is at each end of the bomb beneath the removable nose and tail end caps. Electrical cables, internally installed in the bomb, provide for electrical connection of the initiator and the igniter fuzes. The AN-M23A1 igniter and the FMU-7/B, -7A/B or -7B/B electrical nose fuze are used with this fire bomb. The filled BLU-27 weighs 870 pounds without fins, and 885 pounds with fins. It is 130 inches long and 18.5 inches in diameter.

NOTE

Early production fuze systems have an arming delay that prevents arming when the bomb is released from an altitude of 50 feet or less. The arming delay of later FMU-7/B and the FMU-7A/B and -7B/B fuze systems is shortened to enable the fuze system to arm the bomb before impact when released from an altitude of 30 feet or greater.

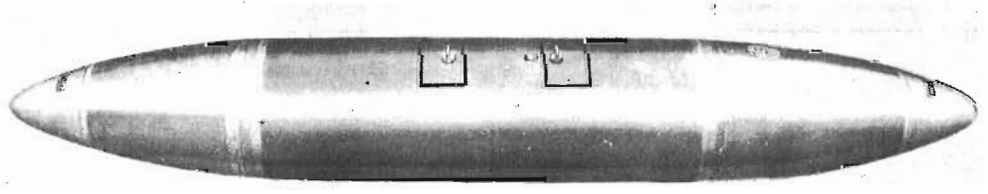


Figure 1-79. BLU-1, BLU-27 and BLU-32A/B Fire Bombs

The BLU-27 finned or unfinned fire bomb will be released from the outboard stations in the low-blow pylon release mode. The BLU-27 finned or unfinned fire bomb may be released from the inboard stations in either low-blow or high-blow release mode when type IB pylon is used. Release from other than type IB pylon from the inboard stations will be in the high-blow release mode.

BLU-32A/B FIRE BOMB. The BLU-32A/B fire bomb (figure 1-79) is an incendiary air munition filled with napalm B. It is shipped preassembled and prefilled, and is designed for external carriage with forced-ejection release systems. The bomb has a cylindrical body with a tapered nose and a tail that may or may not have fins. The basic structural material is aluminum with steel suspension lugs in the top of the bomb. A reinforced area below each suspension lug provides for forced ejection from the aircraft pylons. An initiator cavity is between the suspension lugs on the top of the bomb. An igniter cavity is at each end bulkhead of the bomb. Electrical cables, internally installed in the bomb, provide for electrical connection of the initiator and the igniter fuzes. The bomb is fitted with removable nose and tail end caps which provide covers for the fuze-igniter assemblies. The bomb is fuzed in the same manner as the BLU-1( ), and utilizes the M23A1 igniter. The BLU-32A/B is a smaller version of the other BLU-series bombs and is externally similar. The filled BLU-32A/B weighs 510 pounds without fins and 525 pounds with fins. It is 119 inches long and 15.75 inches in diameter.

BLU-32A/B fire bombs, unfinned, shall be released from all wing stations with the pylon slide valve in high-blow position, so that the bombs will clear the airplane.

BLU-52/B (CS-1 Filled), BLU-52A/B (CS-2 Filled) Bombs.

BLU-52/B (CS-1 FILLED) BOMB. The BLU-52/B (CS-1 filled) bomb (figure 1-80) consists of the empty shell of the BLU-1( ) fire bomb, filled with (powdered) CS-1. The BLU-52/B bomb is designed for external carriage on high performance aircraft with a forced ejection release system, but can be released from low speed aircraft. When employed with the CS-1 filling, the bomb is equipped with a tail fin. The bomb has a cylindrical body with a tapered nose and tail. The basic structural material is aluminum with a reinforced area below the lugs for sway bracing and full power ejection. Steel suspension lugs, spaced 14 inches apart, are inserted in the top of the bomb. No fuze or initiator is used with the bomb when it has CS-1 filling. The bomb loaded with CS-1 weighs 340 ±30 pounds.

BLU-52A/B (CS-2 FILLED) BOMB. The BLU-52A/B (CS-2 filled) bomb is identical to the BLU-52/B bomb except that it is filled with CS-2.

The following WARNING notes apply to aircrews using the BLU-52 series bombs:

WARNING

The BLU-52, being unfuzed, cannot be jettisoned safe. This store must therefore be released over unfriendly or uninhabited territory and must not be returned to base.

- Crew members on aircraft carrying the BLU-52 must carry gas masks for emergency evacuation in event of accidental release of the store while on the ground, as well as for delivery.
- The BLU-52 bomb must be expended (ejected or jettisoned) once it is airborne. If, for any reason, it cannot be delivered to the original, or alternate target, it must be released over designated hostile territory or over designated uninhabitable

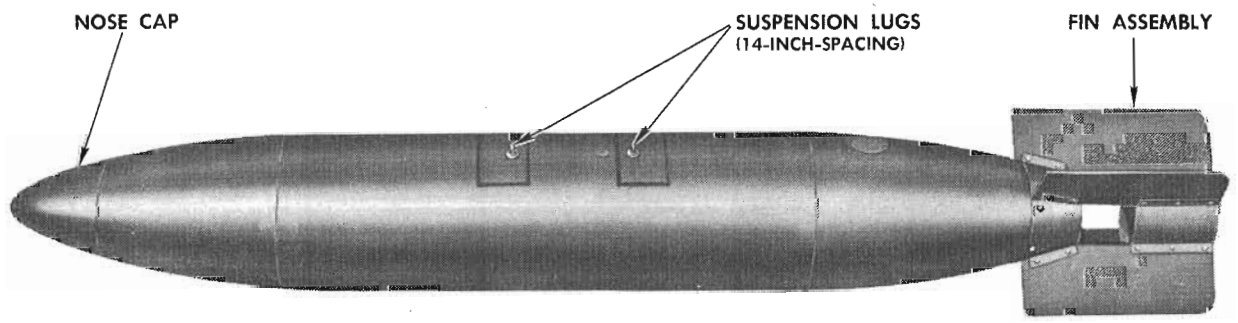


Figure 1-80. BLU-52/B(CS-1 Filled), and BLU-52A/B(CS-Filled) Bombs

territory at least five miles from the nearest habitable site. Preferred sites will be selected by the local commander.

- Aircrew members on aircraft going to or near (within 5 miles and below 5000 feet AGL) a target area already hit, or to be hit, by BLU-52 bombs, will carry the M-24 gas mask. The mask will be worn anytime the aircraft is within five miles of the target and below 5000 feet AGL.

- Aircraft carrying the BLU-52 should be the last to take off and the last to approach a target area. All other aircraft should evacuate to a distance of at least five miles while BLU-52 bombs are being delivered. Aircraft releasing the bombs should vacate the target area as soon as possible and remain at least five miles from the target or above 5000 feet AGL.

See Classified supplement T.O. 1F-100D(I)-34-1-1S-54 for further information.

CBU-1, CBU-2, CBU-3, CBU-9, CBU-12, CBU-46 Series Dispensers. The CBU- (clustered bomb unit) series dispenser (figure 1-81) is a multiple-store dispenser for delivery of small munitions. It consists of an SUU (suspension and release unit) series dispenser and BLU (bomb live unit) series bomblets. The dispenser is cylindrical with a hemispherical nose and a conical tail assembly. Each dispenser has 19 thin aluminum tubes shaped to fit the conical contour of the tail assembly. The basic structural material is aluminum with steel suspension lugs inserted in the top of the dispenser. The forward portion of the casing is an empty plenum chamber. A 6-inch-diameter hole in the forward end of the dispenser permits entry of ram air into the plenum changer. A bulkhead at the aft end of the plenum chamber is drilled to permit porting of the recovered ram pressure into each of the 19 tubes. At the end of the dispenser, the 19 tubes are varied in length to form a conical exit section, further reducing aerodynamic drag.

Bomblets are retained in the dispenser by means of an explosive detent that fits into a keyway in the tube retaining plug. This plug is the last item loaded in each tube. At the forward end of each tube, ahead of the bomblets, a spring (unattached) and a piston (unattached) are loaded. When the airplane release circuitry fires the explosive detent, this spring overcomes initial tube-load inertia and starts the train of bomblets moving rearward.

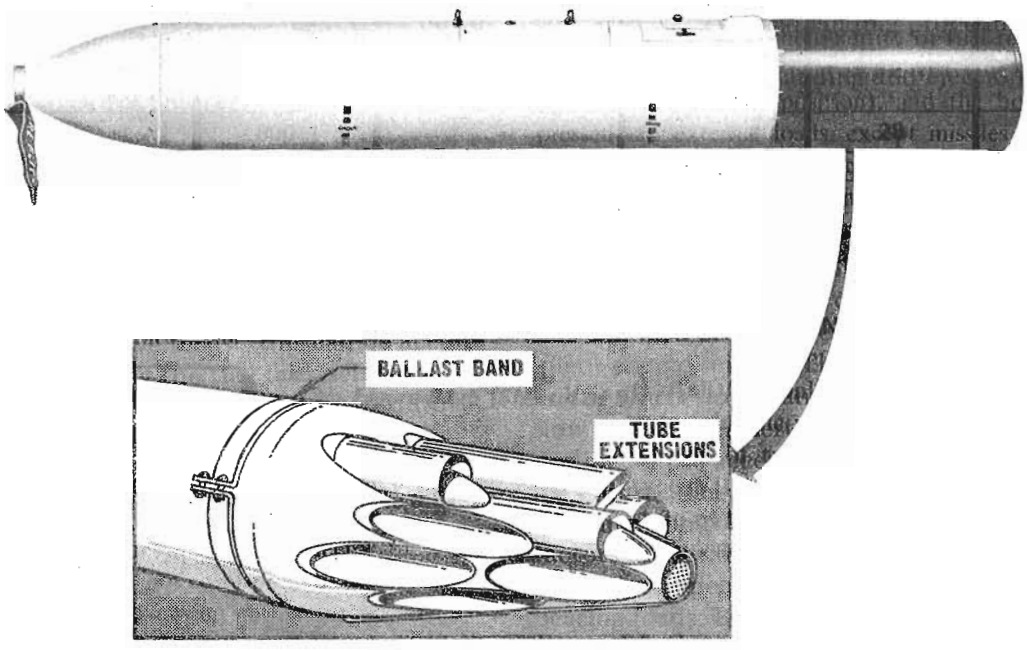


Figure 1-81. CBU-1, CBU-2, CBU-3, CBU-9, CBU-12, and CBU-46 Series Dispensers

Recovered ram-air pressure from the plenum chamber acts on the piston to complete the ejection sequence.

The CBU-series dispensers are identical, with the following exceptions:

CBU	DISPENSER	BOMBLET	REMARKS
CBU-1A/A	SUU-7A/A	BLU-4A/B	
-2/A	-7A/A	-3/B	Only 17 tubes loaded
-2A/A	-7A/A	-3/B	Some have salvo capability
-2B/A	-7B/A	-3/B	Internally inst. ballast
-2C/A	-7C/A	-3/B	Externally inst. ballast
-3/A	-10/A	-7/B	
-3A/A	-10A/A	-7A/B	
-9/A	-7A/A	-28/B (Dummy)	For training use
-9A/A	-7B/A	-28/B (Dummy)	For training use
-9B/A	-7C/A	-28/B (Dummy)	For training use
-12/A	-7B/A	-17/B	
-12A/A	-7C/A	-17/B	
-46/A	-7C/A	-66/B	Only 18 tubes loaded

A panel on the forward upper-section of the dispenser may be removed to expose the tube selection electrical plugs. Mating of these connections permits tube sequencing to be selected. The selection of tube option determines the number of tubes that will be activated with each release signal. On the aft left side of the dispenser is a panel which, when removed, exposes the electrical detent circuit plug. When disconnected, this connector isolates the explosive detents from the remainder of the firing circuit. The plug shall never be connected except in an authorized arming area.

The dispenser is adapted for use with pylons having forced-ejection systems. Provisions for either single- or double-lug suspensions are provided on the top of the dispenser. The double-suspension lugs are spaced to be compatible with the 14-inch bomb racks. An electrical receptacle on the top of the dispenser provides for connection to the airplane armament circuitry. The dispenser is delivered with stores loaded.

The major differences between the dispensers are:

a. The SUU-7A/A dispenser has a one-, two-, or three-tube release capability which may be selected by removing the stepper switch access cover, disconnecting the electrical connector and plugging the connector into the proper receptacle for desired tube selection.

b. The SUU-7B/A dispenser has a two-, four-, or six-tube release capability which is selected by an external tube release selection switch just aft of the electrical receptacle plate.

c. The SUU-7C/A dispenser has a two-, four-, or six-tube, or salvo release capability which is selected by an external tube release selection switch just aft of the electrical receptacle plate.

d. The SUU-10/A uses an intervalometer instead of a stepper switch, and provides a simultaneous firing of all 19 tube detents.

e. The SUU-10A/A has a detent connector with a removable jumper plug on the top of the dispenser opposite the pushbutton safety switch, and has a bomb safety retainer.

All dispensers are 15.6 inches in diameter, and are approximately 118.4 inches in length. The fully loaded weights of the CBU's are as follows:

CBU	WEIGHT (Pounds)
CBU-1A/A	752
-2/A	749
-2A/A	828
-2B/A	840
-2C/A	877
-3/A	658
-9/A	825
-9A/A	830
-9B/A	867
-12/A	738
-12/A/A	657
-46/A	880

Refer to Classified Supplement, T.O. 1F-100D(I)-34-1-1B, for additional information on the CBU series dispenser.

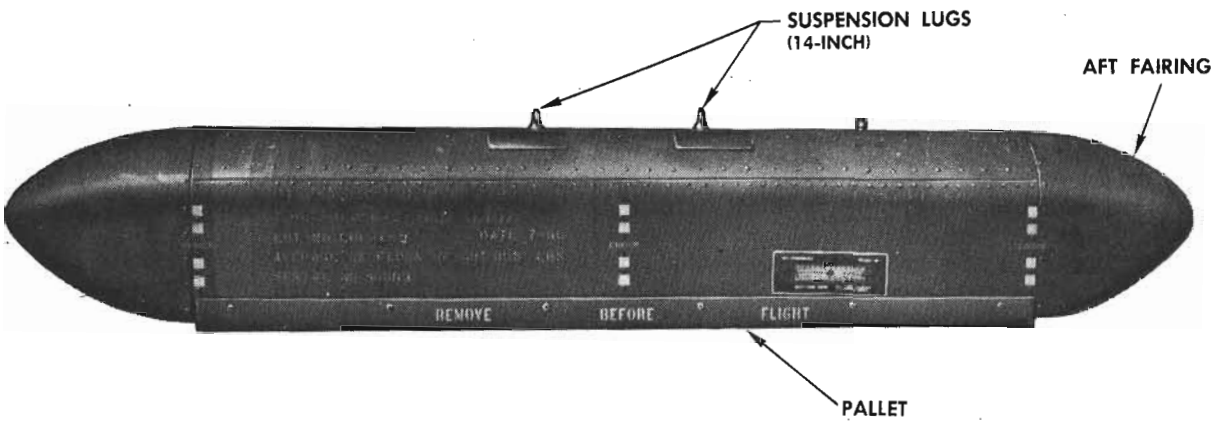


Figure 1-82. CBU-7, CBU-28, CBU-30, and CBU-37 Series Dispensers

CBU-7, CBU-28, CBU-30, CBU-37 Series Dispensers. The CBU-7/A, CBU-28/A, CBU-28A/A, CBU-30/A and CBU-37/A are all multistore weapons that utilize the SUU-13/A downward ejection dispenser (figure 1-82). The major differences between the CBU's are as follows:

CBU	BOMBLET	LOADED WEIGHT (Pounds)
CBU-7/A	BLU-18/B	849
-28/A	-43/B	500 (early) 473 (late)
-28A/A	-43A/B	500 (early) 473 (late)
-30/A	-39/B	385
-37/A	-44/B	473 (late)

The SUU-13/A dispenser is designed as an all-station capability external store incorporating the standard 14 inch lug spacing. The dispenser is made of high-strength aluminum, and is especially fabricated so that it has a flat open bottom, flat sides, and a curved hardback section. The SUU-13/A dispenser, with normal fairings, is 101.25 inches long, 14.47 inches wide, and 14.39 inches high.

The dispenser is delivered factory loaded, ready for loading on the aircraft, except for required serviceability inspection and intervalometer setting.

The SUU-13/A dispenser operates from any pylon of the F-100C/D/F aircraft with the standard 14 inch lug spacing and 28-vdc power supply. The bomb packages are ejected from the dispenser when the aircraft arming circuit is energized and the pilot depresses the firing button. When the firing button is depressed an electrical current fires the electrically primed cartridge of the cylinder and activates the stepping mechanism; a control intervalometer continues a stepfire one tube at a time until the pilot releases the firing button. The pulse rate or time spacing between the tube firings is controlled by a transistor timing circuit. The rate of stepping is preset on the ground by means of a selector switch located in the dispenser control box. The authorized pulse rates are 100, 200, 300, 400, and 500 milliseconds, on the F-100. The 50 milliseconds rate is not authorized for the F-100.

The dispenser payloads are contained in the SUU-13/A in a sealed cylinder assembly which also contains the expulsion cartridge. The expulsion cartridge is located within a high-pressure chamber. The gases produced on detonation of the cartridge are metered through a small orifice in a high-pressure chamber to a low-pressure chamber. The reduced pressure limits the reaction on the dispenser and, in turn, to the aircraft, yet produces a payload ejection velocity of approximately 65 fps. The SUU-13/A dispenser utilizes the payload tubes for structural support. These tubes may be flown either full or empty without reducing the structural integrity of the dispenser.

The CBU-7/A, CBU-28/A, and CBU-30/A delivery tables (see T.O. 1F-100C(I)-34-1-2) list the total impact pattern length for a 40-cluster release at the various available SUU-13/A intervalometer settings. This impact pattern length is based on the distance between the mean point of impact for the first and last cluster release. The tabulated sight depression from flight path values assume that the center of the pattern is to be aimed at the target. Additional information concerning these munitions is contained in T.O. 1F-100D(I)-34-1-1B.

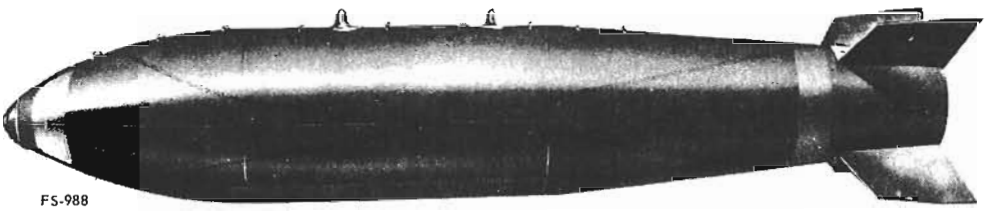


Figure 1-83. CBU-24, CBU-29, CBU-49, CBU-52, CBU-53, and CBU-54, -58 and -71 Series Dispensers

CBU-24, -29, -49, -52/B, -53/B, -54/B, -58/B AND -71/B SERIES DISPENSERS. The CBU-24 series, -29 series, -49 series, -52/B, -53/B, -54/B, -58/B and -71/B are all multi-store weapons consisting of a SUU-30 series dispenser loaded with bomblets (figure 1-83). These air-launched, unguided cluster dispensers are intended for tactical use against personnel and light material targets. All can be fuzed with either the M907E1 or M907E2 fuze. The CBU-52/B dispenser fully loaded weighs 740 pounds. It is 16 inches in diameter and 92 inches long with FMU-56/B fuze attached. The dispenser is released in the same manner as any standard general purpose bomb. Upon release of the dispenser, the arming wire attached to the aircraft dispenser fuze is withdrawn, initiating the dispenser fuze arming and time-delay period. When the fuze functions, the booster is ignited and the nose locking cap and fuze are blown forward, unlocking the dispenser, forces the two halves apart, hinging them about the aft retaining ring. The BLU-61/B bombs are instantaneously dispersed. The major differences between the CBU's are as follows:

CBU	DISPENSER	BOMBLET	ADDITIONAL FUZING OPTION
CBU-24/B	SUU-30/B	BLU-26/B	
-24A/B	-30A/B	-26/B	
-24B/B	-30B/B	-26/B	FMU-26A/B
			-26B/B
			-56/B
			-56D/B
			-110/B
-24C/B	-30C/B	-26/B	
-29/B	-30/B	-36/B	
-29A/B	-30A/B	-36/B	
-29B/B	-30B/B	-36/B	FMU-26A/B
			-26B/B
			-56/B
			-56D/B
			-110/B
-29C/B	-30C/B	-36/B	
-49/B	-30/B	-59/B	
-49A/B	-30A/B	-59/B	
-49B/B	-30B/B	-59/B	FMU-26A/B
			-26B/B
			-56/B
			-56D/B
			-110/B
-49C/B	-30C/B	-59/B	
-52/B	-30B/B	-61/B	FMU-26A/B
-53/B	-30B/B	-70/B	-26B/B
-54/B	-30B/B	-68/B	-56/B
-58/B	-30H/B	-63/B	-56D/B
-71/B	-30H/B	-86/B	-110/B

SUU-30/B, A/B, B/B, and H/B dispensers are divided in half longitudinally. The upper half contains the strongback section; the lower half contains a reinforced hardshell area for reinforcement while stored on chocks. The two halves are locked together by a base plate screwed into both halves at the aft end. A dual set of external arming wire guides are positioned along the top half to prevent excess arming wire vibration and to route the arming wire around the pylon ejector food. Two identical dual-fin attachments are on the aft end of the dispenser body. On the SUU-30/B, the fins are canted 2-1/2 degrees to impart spin to the dispenser when released from the airplane. The wrought aluminum alloy fins can be mounted either in (+) or (X) configuration for compatibility with various airplanes. All fins and associated hardware are shipped unassembled with the dispenser. The fully loaded dispenser weighs approximately 830 pounds. It is 16 inches in diameter and 87 inches long without the fuze.

The SUU-30B/B is constructed to accommodate the FMU-26A/B, B/B, -56/B, D/B, and -110/B fuzes. Except for the nose section and the installation of a lanyard attachment stud behind the aft suspension lug, the dispenser is identical to the SUU-30A/B. The nose section of the SUU-30B/B contains a nose cap, coupling, adapter, and plug, breech cap and lanyard tube. The stud between the aft suspension lug and the tail fin provides an attachment point for lanyards used with FMU-26A/B, B/B, -56/B, D/B and -110/B fuzes.

BLU-61/B FRAGMENTATION BOMB. The BLU-61/B is an anti-materiel bomb which is 3.3 inches in diameter, weighs approximately 2.2 pounds, consisting of steel fragments encased by a plastic matrix. The shells are filled with a high explosive material and a fuze that detonates upon impact.

The bomblets are loaded into the dispenser at the factory and the dispensers are delivered to the flight-line ready for loading on the aircraft.

The impact pattern date, M907 fuze setting, sight depression angles, etc., for the CBU-24/B and CBU-29/B should also be used for the CBU-24A/B and CBU-29A/B. The impact pattern date, fuze settings, etc., listed for the

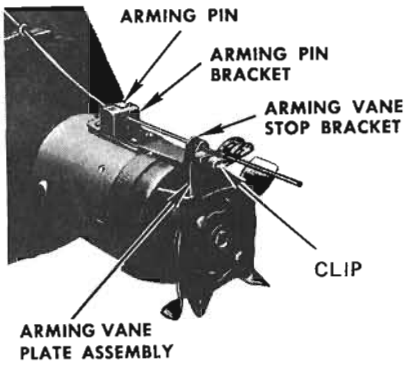


Figure 1-84. Arming Wire Installations for CBU-24, -29, -49, -52, -53, -54, -58, -71 Series Dispensers

CBU-24/B and CBU-29/B are also applicable for use with -24B/B, -29B/B, -52/B, -53/B, -54/B, -58/B, -71/B using the FMU-26A/B, FMU-26B/B, FMU-56/B, FMU-56D/B, and FMU-110/B fuze. For additional information on the resulting BLU-26/B and BLU-36/B pattern diameter and arming limitations, refer to classified supplement, T.O. 1F-100D(I)-34-1-1B.

NOTE

Since time fuzing is involved, and certain arming criteria shall be met, it is necessary to carefully preplan and execute any mission involving the delivery of the dispensers. Refer to classified supplement, T.O. 1F-100D(I)-34-1-1B, for additional information on the cluster dispensers.

ARMING WIRE INSTALLATIONS FOR CBU-24, -29, -49, -52, -53, -54, -58, AND -71 SERIES DISPENSERS. The following applies to CBU's fuzes with and M907E1 or M907E2 fuze: One arming wire, with swivel loop, runs from the nose fuze (see figure 1-84) through the arming wire guides (omitting those between the suspension lugs) and is secured to the retention post.

The following applies only to a SUU-30B/B or H/B fuzed with and FMU-26A/B, B/B, -56/B, D/B, -110/B fuze: The arming lanyard is run through the arming wire guides (omitting those between the suspension lugs), through two swivel loops, and is secured to the binding post (see figure 1-85).

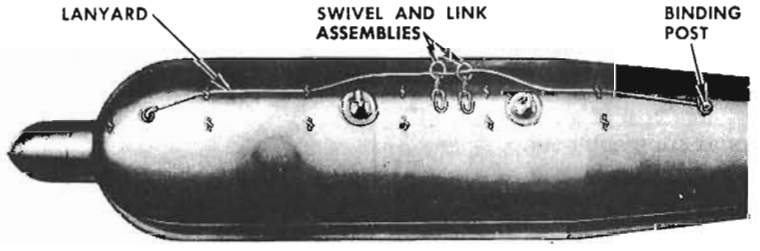


Figure 1-85. Arming Wire Installations for CBU-24, CBU-29, CBU-49, CBU-52, CBU-53, CBU-54, CBU-58, CBU-71 Series Dispensers

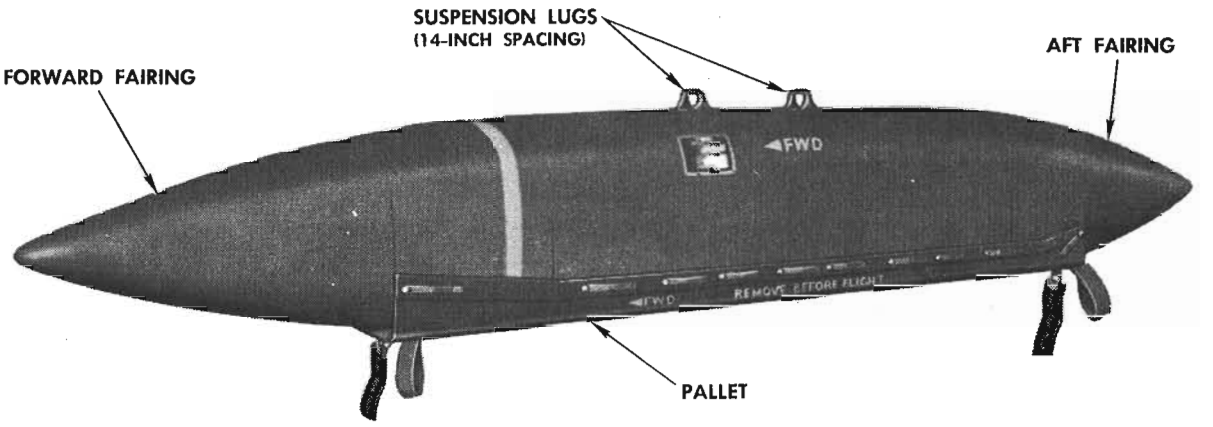


Figure 1-86. CBU-34 and CBU-42 Series Dispensers

CBU-34 and CBU-42 Series Dispensers. The CBU-34/A, CBU-34A/A and CBU-42/A are all multistore weapons that utilize the SUU-38/A downward ejection dispenser (figure 1-86). They differ only in the bomblet carried.

CBU	BOMBLET
CBU-34/A -34A/A -42/A	BLU-42/B -42A/B -54/B

The SUU-38/A dispenser is designed as an all-station-capability external store incorporating the standard 14 inch lug spacing. The dispenser is made of high-strength aluminum, and is especially fabricated so that it has a flat open bottom, flat sides, and a curved hardback section. The SUU-38/A dispenser is 142.0 inches long, 16.0 inches wide, and 16.5 inches high.

Fully loaded weight, including the pallet, is 980 pounds. With the pallet removed, the loaded weight is 905 pounds.

The SUU-38/A dispenser operates from any pylon of the F-100C/D/F aircraft with the standard 14-inch lug spacing and 28-vdc power supply.

The SUU-38/A dispenser has 10 cargo bays, each of which is divided into three compartments. Each compartment contains a cannister loaded with 18 mines. When the aircraft arming circuit is energized, and the pilot presses the firing button, a 28-vdc pulse initiates a cannister ejector cartridge and activates the stepping mechanism. An ejector piston forces the cannister out of the dispenser, and, after a predetermined time interval elapses, a detonator in the cannister fires to separate the sections of the cannister and allow the mines to be dispersed by the airstream. A control intervalometer continues to step-fire one cannister at a time until the pilot releases the firing button. The time interval between cannister ejections is preset on the ground by means of a selector switch located in the dispenser control box. The available pulse rates are: 70, 200, 350, 500, 1000 and 1500 milliseconds.

These dispensers are delivered factory loaded, ready for loading on the aircraft, except for required serviceability inspection and intervalometer setting.

SUU-25 Series Flare/Marker Dispenser. The SUU-25 Series flare/marker dispenser as shown in figure 1-87 is designed as a reuseable, airborn and externally mounted pyrotechnic launching device. The center section is constructed of four metal tubes assembled together and enclosed by an outer skin with metal bulkheads on each end. Located at the top center of the dispenser are two electrical receptacles for connection to the aircraft electrical system. Each electrical receptacle is equipped with a dust cap and ground button to ground the dispenser circuitry for dearming. Only one electrical receptacle is connected to the aircraft for dispenser operation. SUU-25 series flare/marker dispensers are carried on the outboard stations only. Suspension provisions on top of the center section adapt the dispenser to all 14 inch bomb racks. The area around the lugs has been reinforced to permit sway bracing and forced ejection. Each model functions and sequences the loaded munitions differently, however, the outside appearance is typical except the SUU-25A/A model does not have a nose cone. The dispensers are loaded with eight each high-intensity illumination flares, or colored pyrotechnic target markers. The sequencing of flare tube release is accomplished through an intervalometer within the dispenser. Written on the side of the dispenser is information as to type of munition loaded, fuze settings, and date loaded.

SUU-25A/A FLARE DISPENSER. The forward bulkhead has a three inch hole in front of each tube, that allows ram air to assist a compressed spring, installed in each tube, in the ejection of the flares/markers. Installed at the top of the forward bulkhead is an intervalometer used to sequence the ejection of the flares/markers. At the aft end of the dispenser, installed in each tube, is a flare retainer (end plug) held in place against two explosive detents by spring tension. Two ground safety pins with attaching red streamers are used at the aft bulkhead to preclude accidental launching of the munitions from the dispenser. One pin is inserted between the two upper tubes and one between the two lower tubes as shown in figure 1-88a.

a. Physical Characteristics

(1)	Weight (empty)	121 pounds
(2)	Weight (loaded)	340 pounds
(3)	Length	96 inches
(4)	Diameter	14 inches
(5)	Tube diameter	5 inches

b. Components of a Complete Round

(1) Dispenser, SUU-25A/A
(2) Flare, Parachute (8 each)

(a) MK-24 Mod 4
(b) LUU-2/B

OR

(3) Flare, Target Market (8 each)

(a) LUU-1/B (red)
(b) LUU-5/B (green)

(4) Detent Assembly, Explosive (8 each)
(5) Chain, link, S-hook (4 each)
(6) Retainer, Flare, ADU-278/A (end plug) (4 each)

SUU-25B/A FLARE DISPENSER. Impulse cartridges are located at the forward end of each tube. A pyrotechnic protection cover (nose cone) is installed on the forward end for protection. The nose cone also aids the dispenser aerodynamically. At the aft end of the dispenser, installed in each tube, is a blue colored sealing cap, that is installed over the end of the flare/marker (figure 1-88a). At the lower inboard area of each tube is an 'L' shaped retaining link that is positioned against the sealing cap, with a shear pin inserted through the retaining link and bracket. The split-end of the shear pin is spread to lock the retaining link in position. An intervalometer and breeches are located on the forward bulkhead which sequences only one tube or two flares/markers for each depression of the bomb button.

a. Physical Characteristics

(1)	Weight (empty)	157 pounds
(2)	Weight (loaded)	360-385 pounds
(3)	Length	96 inches
(4)	Diameter	14 inches
(5)	Tube diameter	5 inches

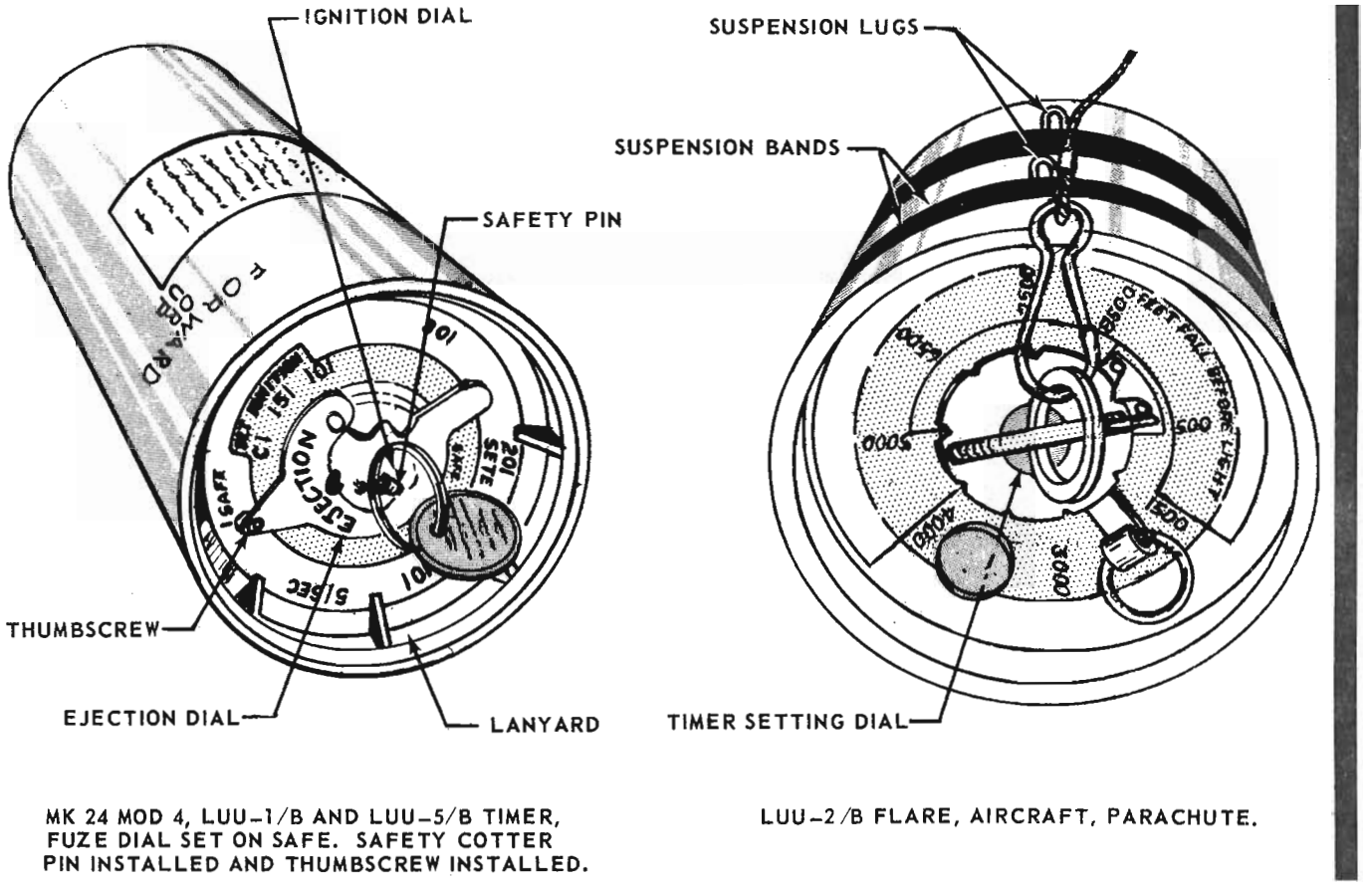


Figure 1-87. MK-24 Mod 4 Flare and LUU-1/B, LUU-2/B and LUU-5/B Marker

b. Components of a Complete Round

(1) SUU-25B/A Dispenser
(2) Impulse cartridge, ARD 863-1 (4 each)
(3) Flare parachute (8 each)
  (a) MK-24 Mod 4 or LUU-2/B
(4) Flare, Target Market (8 each)
  (a) LUU-1/B (red)
  (b) LUU-5/B (green)
(5) Sealing cap, Flare Tube (4 each)
(6) Chain, Link, S-hook (4 each)
(7) Shear pin (4 each)
(8) Pyrotechnic Protection cover (1 each)

SUU-25C/A FLARE DISPENSER An intervalometer and breeches are located on the forward bulkhead. A pyrotechnic protection cover (nose cone) is installed on the forward end for protection. The cover also aids the dispenser aerodynamically. The intervalometer sequences the dispensing of only one munition at a time. However, if the aft flare/marker fails its launching sequence, the forward flare/marker firing sequence will purge the tube, launching both munitions together. On the right hand side of the dispenser in the center section, is a jack in which a shorting pin, with a red streamer attached, can be inserted to interrupt the electrical circuit between the two electrical receptacles and the breeches. This pin electrically safes the dispenser. At the aft end of the dispenser in each tube, the buttom end of the flare/marker can be seen with a blue colored sealing cap ring installed around the munition (figure 1-88A). At the lower inboard area of each tube is an 'L' shaped retaining link that is positioned against the sealing cap ring with a shear pin inserted through the retaining ring and bracket. The split-end of the shear pin is spread to lock the retaining link in position.

a. Physical Characteristics

(1)	Weight (empty)	260 pounds
(2)	Weight (loaded)	475-500 pounds

(3)	Length	96 inches
(4)	Diameter	14 inches
(5)	Tube diameter	5 inches

b. Components of a Complete Round

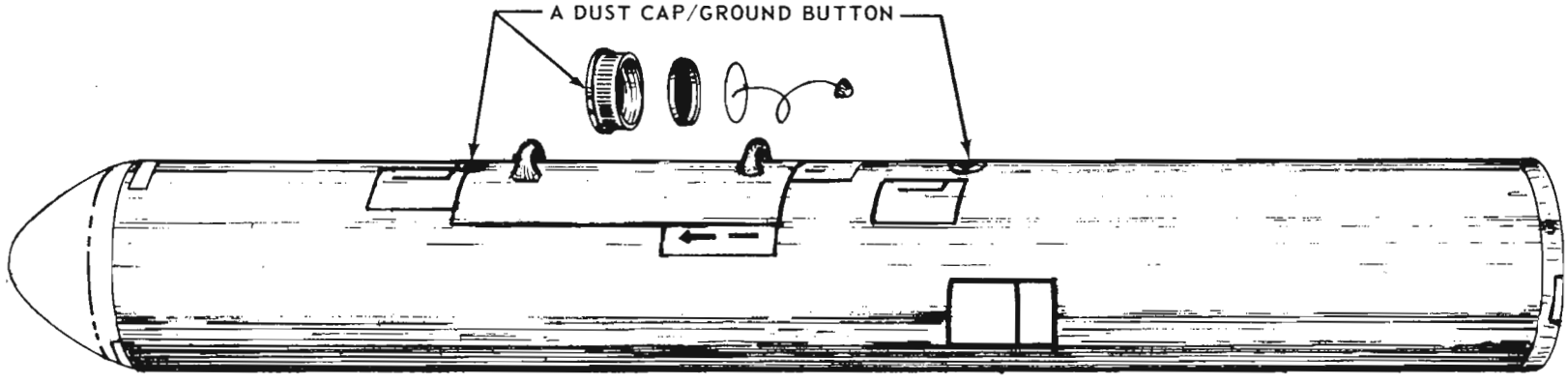
(1) SUU-25C/A Dispenser
(2) Flare, parachute (8 each)
  (a) MK-24 Mod 4 or LUU-2/B
(3) Flare, Target Market (8 each)
  (a) LUU-1/B (red)
  (b) LUU-5/B (green)
(4) Impulse cartridge, ARD 863-1 (8 each)
(5) Shear pins (8 each)
(6) Pyrotechnic Protection Cover (1 each)
(7) Plastic parts kit (1 each)

MK-24 MOD 4 FLARE. The MK-24 Mod 4 parachute flare (figure 1-87) is an incendiary illumination store consisting of a cylindrical aluminum case containing an ejection fuze assembly, an ignition fuze assembly, an illuminate charge (candle), and a parachute assembly. The ejection and ignition fuze assemblies contain time delay mechanisms that may be adjusted for delay times of 5 to 30 seconds, and 10-30 seconds respectively. The ejection delay allows the flare case to fall 300 to 5000 feet before release of the candle and parachute assembly. The ignition delay then allows the suspended candle to fall 198 to 550 feet before ignition. Dials for setting the time delay mechanisms are on the face of the flare. A thumbscrew on the face of the flare prevents inadvertent movement of the time-delay mechanism.

An arming lanyard is provided for activating the ejection fuze assembly time-delay mechanism. When ignited the flare candle produces an average candle power of 2,000,000 for a minimum of two minutes. The MK-24 Mod 4 flare is 36 inches long, 5 inches in diameter, and weighs 26 pounds.

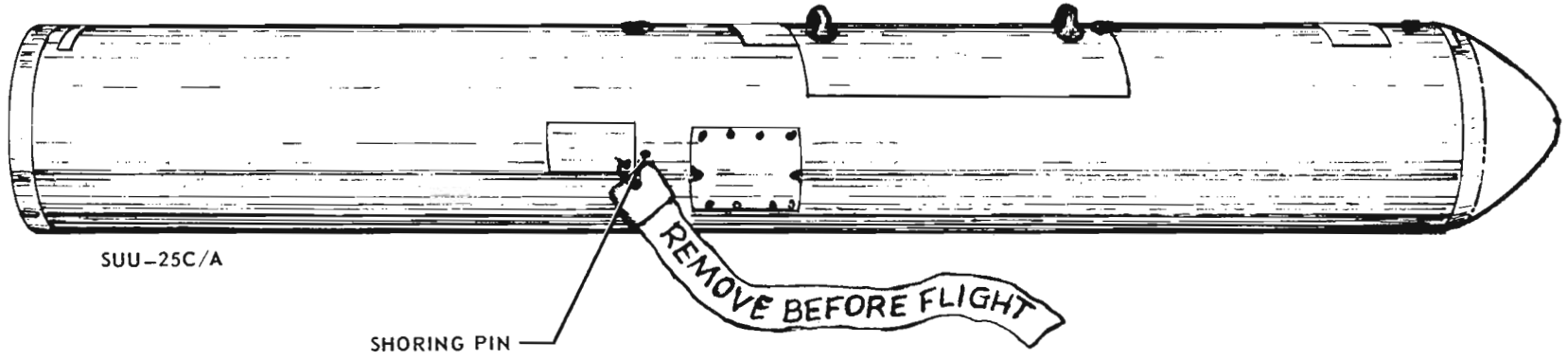
LUU-1/B AND LUU-5/B MARKERS. These markers (figure 1-87) are designed for ground marking of an area. They are identical in external configuration, physical characteristics and operation to the MK-24 Mod 4 aircraft parachute flare. They differ only in that the LUU-1/B is red and the LUU-5/B is green in color. They will burn for 30 minutes. The parachute is of cruciform design, allowing it to fall approximately 30 feet per second and the candle burns from the end nearest the parachute. The design of the parachute also provides the marker with the capability of snagging the top of heavy foliage, making it useful in jungle areas.

LUU-2/B AND LUU-2A/B MARKER. The LUU-2/B and LUU-2A/B flares are pyrotechnic illuminating devices with a 4½ minute burn time. The flare weighs 30 pounds and is identical to the MK-24 flare in external dimensions. Prior to placing the flare into the launcher, the desired free fall distance in feet (delay time) must be set into the timer. This is done by turning the knob in the center of the timer cover clockwise until the pointer is opposite the number of feet desired. The available settings for the LUU-2/B are 500, 1500, 3000, 4000, 5000, 6500, 7500, and 8500 feet. The LUU-2A/B is identical in all respects to the LUU-2/B, except the LUU-2A/B incorporates an improved timer for higher reliability and increased flexibility. The feet of fall settings for the LUU-2A/B are: 500, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, and 11000 feet.



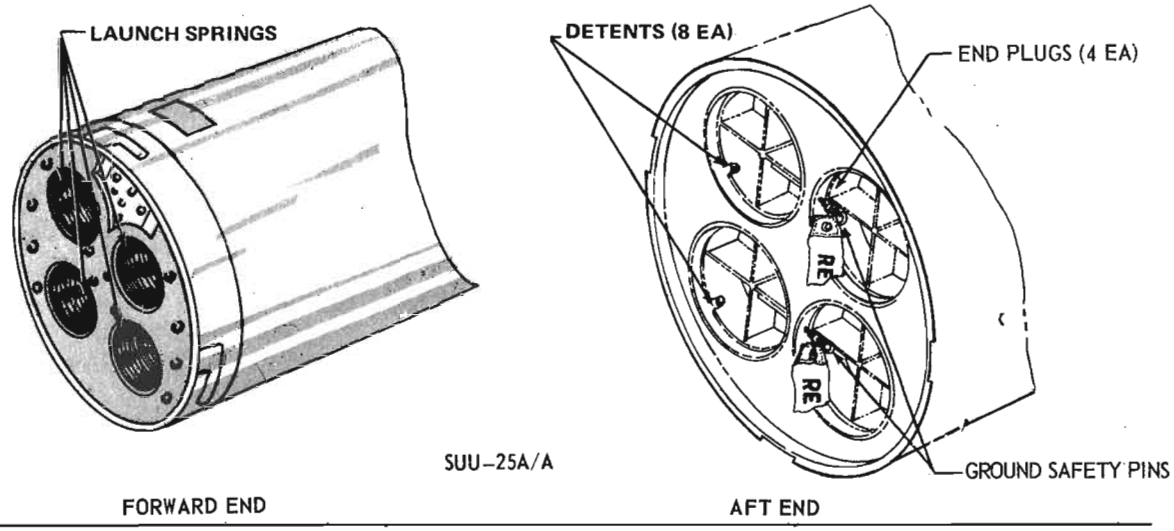
SUU-25A/A AND SUU-25B/A

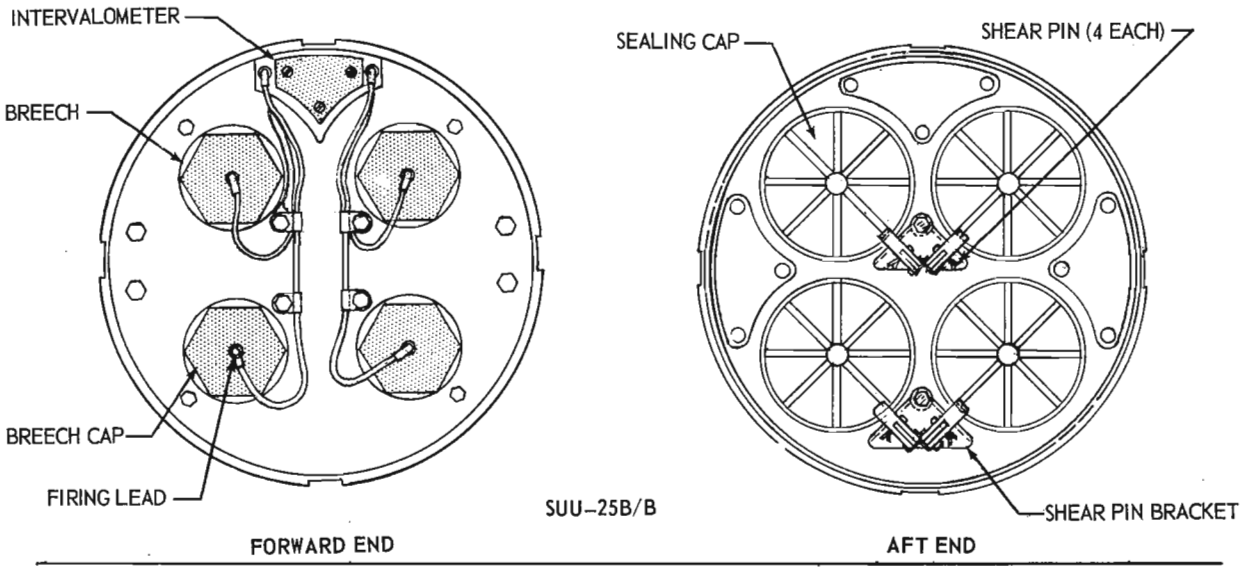
NOTE: SUU-25A/A IS NOT CONFIGURED WITH NOSE CONE



SUU-25C/A

Figure 1-88


LAUNCH SPRINGS
DETENTS (8 EA)
END PLUGS (4 EA)
RE
RE
SUU-25A/A
GROUND SAFETY PINS
FORWARD END
AFT END


INTERVALOMETER
BREECH
BREECH CAP
FIRING LEAD
SEALING CAP
SHEAR PIN (4 EACH)
SUU-25B/B
SHEAR PIN BRACKET
FORWARD END
AFT END

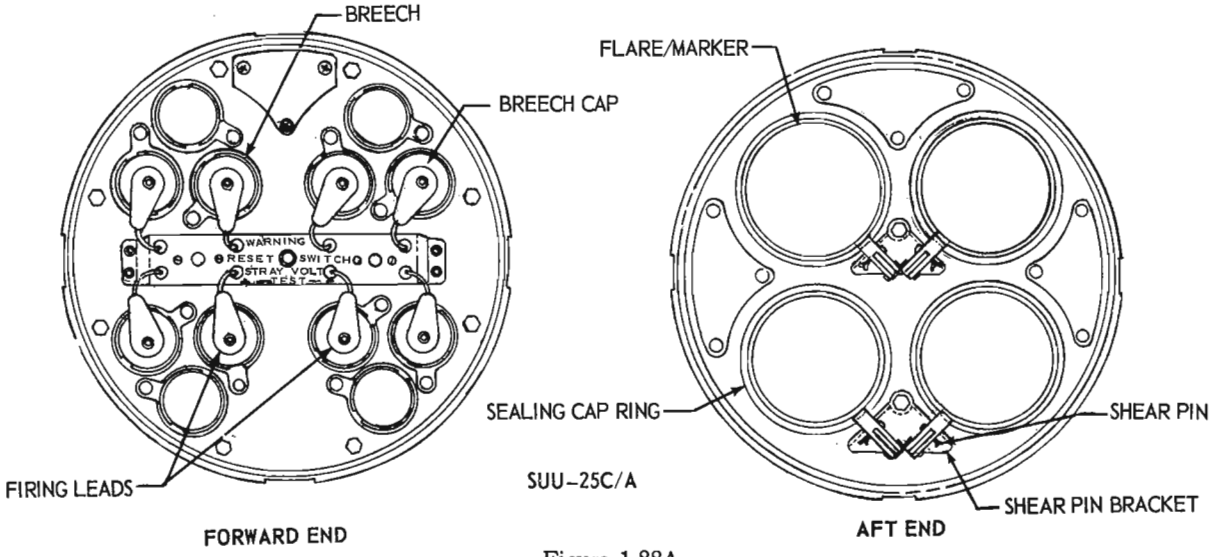

BREECH
BREECH CAP
WARNING
RESET
SWITCH
STRAY VOLT
TEST
FIRING LEADS
FLARE/MARKER
SEALING CAP RING
SHEAR PIN
SUU-25C/A
SHEAR PIN BRACKET
FORWARD END
AFT END

Figure 1-88A

The timer knob on the LUU-2/B and -2B/A will be removed by the launcher as the flare is ejected through the launcher. Removal of the timer cover pulls the timer knob which starts the timer. After the selected time delay, the release mechanism is tripped, allowing the timer and cover to be ejected from the flare case by a spring. As the timer is ejected, it pulls the parachute with it. Deployment of the main parachute produces the shock force on the support cables through the ignition lanyard to rotate the bellcrank in the ignition system, shearing a safety pin and cocking and releasing a firing pin. The firing pin strikes and ignites a primer which ignites boron pellets. The boron pellets ignite a wafer of propellant which ignites the flare candle. Pressure buildup on flare ignition blows out pressure relief plugs in the igniter housing after which the flare case burns through and the ignition housing falls free. The flare burns for approximately 270 seconds. At candle burnout, an explosive bolt releases one parachute support cable causing the parachute to collapse.

MK-12 Mod 0 Leaflet Tank. The leaflet tank is an MK-12 Mod 0 smoke tank (figure 1-89) adapter to deliver and distribute letters, posters, and other leaflet-type materials. The tank has a cylindrical body and is fitted with a nose cone of ogival shape. A detonator-activated nose closure is provided for the nose cone. The rear closure for the tank is a hinged steel plate retained in place by an explosive bolt containing a removable impulse cartridge. The tank has provisions for either 14- or 30-inch lug suspension. The tank electrical wiring harness consists of a five-pin connector on top of the tank, and two two-pin connectors at the nose and rear closure. The five-pin connector is for connection to the airplane circuits, and the two-pin connectors are for the nose closure detonator and the explosive bolt impulse cartridge. The wiring harness also contains a mechanically actuated microswitch to interrupt the nose closure detonator circuit until the rear closure steel plate is opened. A jumper cable assembly electrically connects the impulse cartridge to the tank electrical harness. The loaded MK-12 Mod 0 weighs 1,000 pounds, is 109 inches long and is 14 inches in diameter.

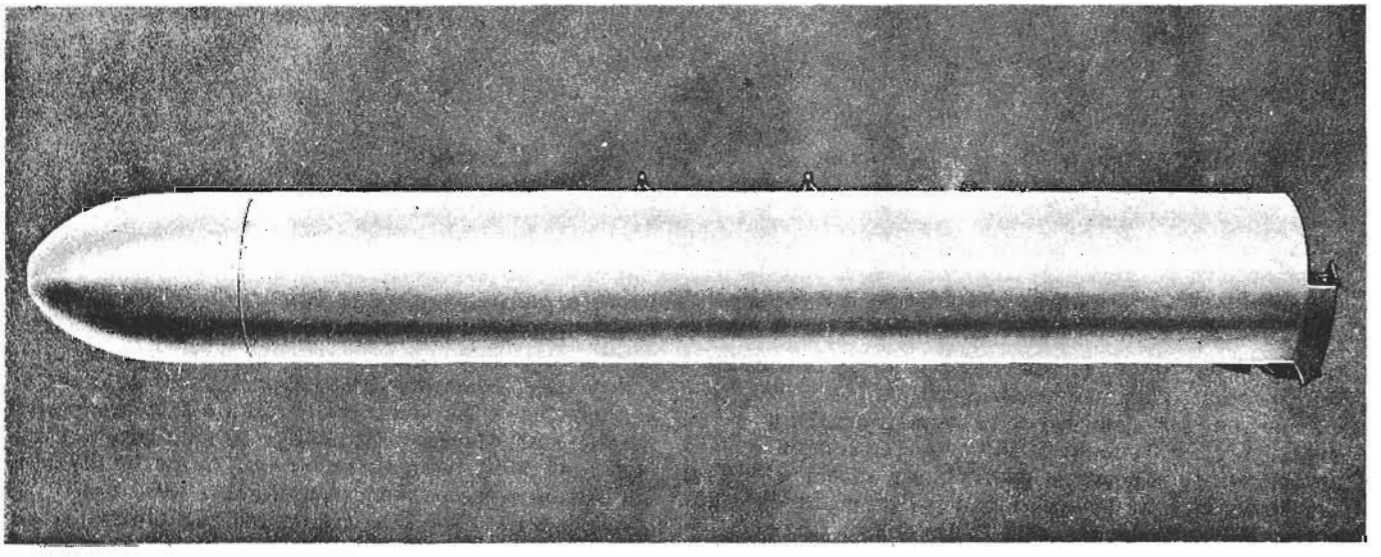


Figure 1-89. MK-12 Mod O Leaflet Tank

NONNUCLEAR WEAPON FUZES.

A fuze is a device used to initiate a detonation at the time and under the circumstances desired. Targets are usually selected in advance of a mission, and since the structure of the target indicates the type of fuzing that would produce the best results, it is imperative that the correct fuzing system be installed in the weapon. Many weapons can accommodate a large variety of fuzes that can drastically change the effects. All tactical fighter pilots must be familiar with the classification and operation of fuzes, to effectively plan the mode of delivery and insure safe separation from the contemplated weapon effects.

WARNING

Improper employment of a weapon fuze combination may result in serious damage to the airplane or injury to the pilot.

Classification of Bomb Fuzes. Bomb fuzes may be separated into two general classifications: position (in the bomb) and means of functioning (action). (See figure 1-90.)

POSITION. Formerly, some bomb fuzes were installed transversely, but at present they are installed in the nose and/or tail of the bomb. Nose and tail fuzes usually are not interchangeable because of differences in arming devices and internal operation. Some fuzes, such as the M173 bomb igniter fuze, arm by falling with either end of the bomb toward the direction of fall and function at any angle of impact. This type can be used in either the bomb nose or the bomb tail.

Means of Functioning. Fuzes are also classified according to the method of detonation, resulting from:

a. Impact – Impact of the fuze with the target.

b. Proximity – Nearness to the target.

c. Time – A predetermined number of seconds after release.

d. Hydrostatic – Water pressure.

Methods of Arming. Fuzes are armed in one (or a combination) of four methods:

a. Vane. The arming-vane type has a vane (propeller or anemometer) that is rotated after release by air floating past the falling bomb. When the vane has rotated the required number of times, the fuze is armed.

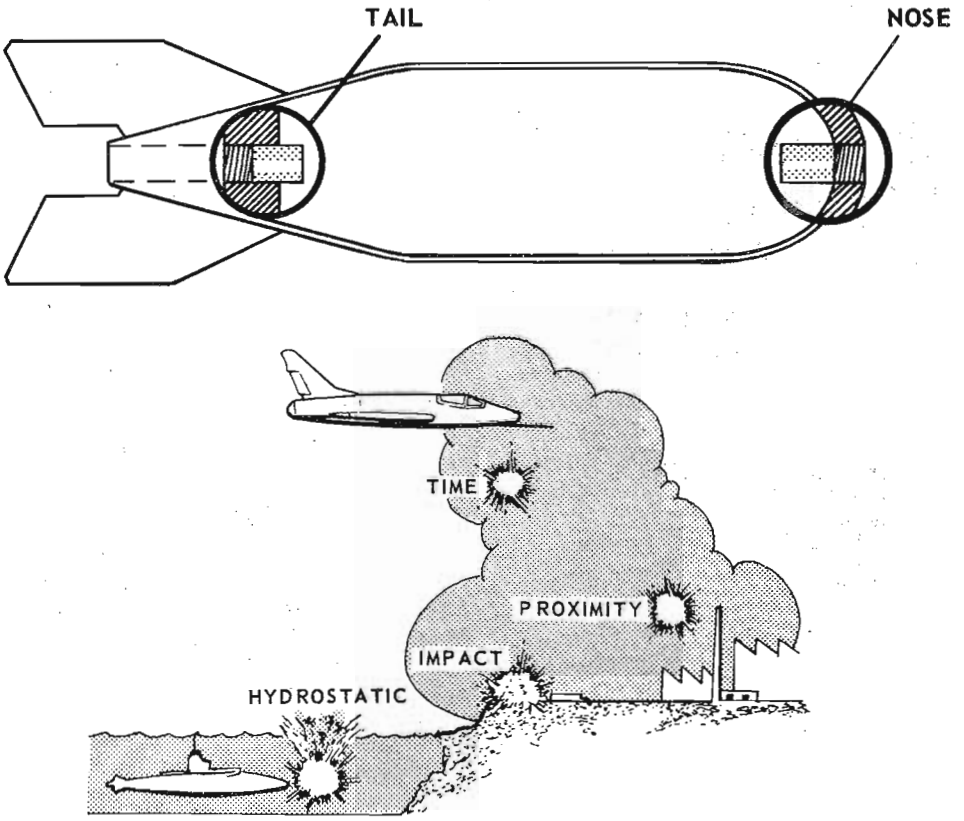


Figure 1-90. Fuze Position and Function

b. Pin. The arming-pin type fuze has a pin or plunger that is ejected or withdrawn by spring action when the bomb is released. The ejection of the pin releases the arming mechanism and allows the fuze to arm.

c. Inertia. The inertia-arming type is armed by an abrupt change in the velocity of the falling bomb.

d. Electric. The electrical-arming type fuze is armed by a thermal battery, activated at bomb release by the extraction of an arming lanyard.

Arming-Time Interval. Both arming-pin type and arming-vane type fuzes are further classified according to arming-time interval, i.e., direct arming or delayed arming.

a. Direct arming. A direct-arming fuze is armed immediately when the arming pin is ejected or when the arming vane has rotated the required number of revolutions.

b. Delayed arming. The delayed-arming fuze has an arming pin or arming vane that operates as in the direct-arming fuze, but instead of arming the fuze directly, the mechanism controlled by the pin or vane initiates a powder train or clockwork mechanism that arms the fuze after a predetermined time.

Safety Features. For safety reasons, a bomb must be incapable of exploding, through fuze action, before it is clear of the aircraft. By definition, a fuze is armed when the next normally expected event will initiate a function of the fuze. As previously discussed, that event may be impact, time of train running to completion, nearness to the target, or water pressure. As shipped, fuzes are in a safe (unarmed) condition. They are so constructed that while unarmed, they cannot function. To prevent premature or accidental functioning of a fuze, a safety feature is incorporated when the fuze is manufactured. The most common safety features in fuzes include detonator-safe, arming-stem-safe, and safety-block-safe devices.

a. Detonator-safe. A detonator-safe arrangement (figure 1-91) in a fuze holds one of the explosive train elements out of alignment with the other elements. For example, the detonator may be held out of line with the firing pin until the fuze is armed.

b. Arming-stem-safe. A safety feature commonly found in tail fuzes is an arming stem screwed into the firing pin plunger. (See figure 1-92.) In this type of fuze, the detonator is immediately beneath the firing pin. Arming of the fuze withdraws the arming stem from the firing-pin plunger, thus freeing the plunger. An anticreep spring prevents premature movement of the plunger.

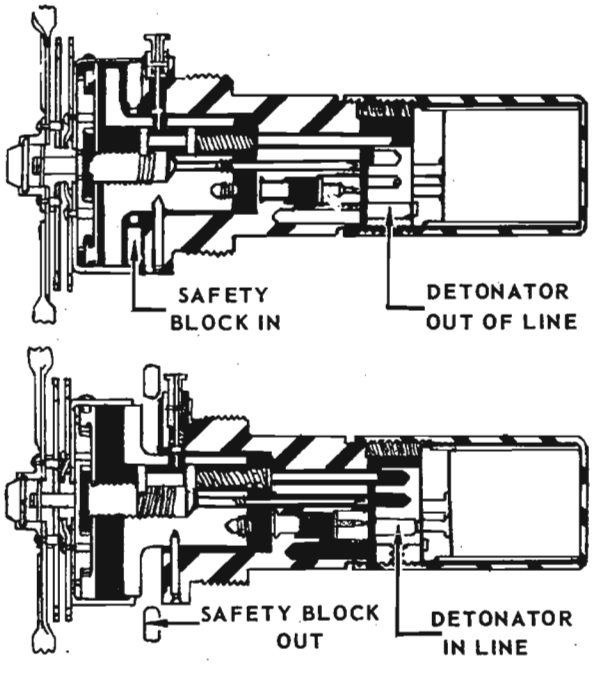


Figure 1-91. Detonator-Safe Fuze Configuration (Typical)

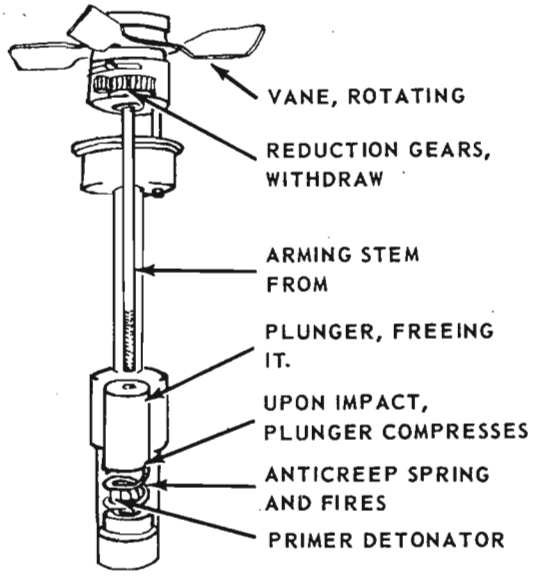
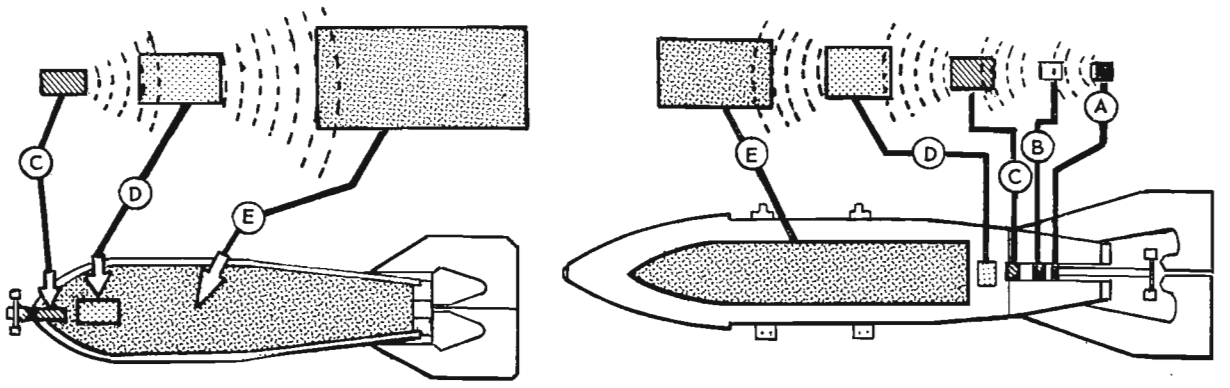


Figure 1-92. Arming-Stem Safe Tail Fuze Configuration



A = PRIMER B = DELAY

C = DETONATOR D = BOOSTER

E = BURSTING CHARGE

Figure 1-93. Explosive Train

c. Safety-block-safe. This safety feature, commonly found in nose fuzes, consists of a ring of small steel blocks between the striker and the fuze body, which prevent the firing pin from contacting the primer or detonator. The arming vane drives a gear train which, after a definite interval, permits the safety blocks to be ejected. (See figure 1-91.)

EXPLOSIVE TRAIN.

An explosive train (figure 1-93) controls the functioning of an item of ammunition. Such a train is a sequence of explosions in which a small quantity of a very sensitive explosive ultimately sets off a larger quantity of a much less sensitive explosive. The two basic explosive trains are the propelling charge (discussed under ammunition) and the bursting charge as contained in bombs. The type of explosive used in such large quantities as in the loading of bombs must be relatively insensitive to shock and heat. This is necessary because it provides a reasonable degree of safety in storing, shipping, and handling; allows the bomb to be dropped safe over friendly territory; and permits the bomb to be used to penetrate a resistant target such as armorplate, thick earth, or concrete, before exploding. The type of explosive used in the fuze shall be very sensitive so that it will be sure to explode when impacted by the firing pin. Such an explosive is not safe to handle except in minute quantities, and, therefore, is strongly compressed into a metal capsule called a detonator. These are built into fuzes. Because the shock generated by the explosion of a detonator is not sufficiently strong to be reliable as a means of exploding the large amount of insensitive explosive that makes up the main charge of the bomb, a small quantity of explosive, more sensitive than the main charge, is placed next to the detonator. This element is called the booster. The booster is sensitive enough to be exploded by the detonator and large enough so that the shock of its explosion will explode the bursting charge of the bomb. Such an arrangement of elements is called the explosive train, and is the basic method of operation in all explosive ammunition.

TYPES OF EXPLOSIVE TRAINS. The explosive train operation, in both nose and tail fuzes, may be instantaneous or delayed action.

a. Instantaneous operation begins immediately upon weapon impact with the target when the firing pin is driven into the detonator (approximately the size of an aspirin tablet). The blast from the detonator explodes the booster (about the size of a flashlight battery), which relays and amplifies the blast, causing the bursting charge to explode.

b. A delay-action train may be necessary to allow bomb penetration of a target or to permit a low-flying airplane that carried the bomb to escape from the target area. This action requires two additional components, a primer and a delay element, placed ahead of the detonator, booster, and main charge. In this arrangement, the action starts off as a detonation but is converted into a delaying flame by the delay element. The detonator again changes it into a detonation that continues through the booster into the main charge.

FUZE \ BOMB/CBU	M65A1 GP Bomb	M117 GP Bomb	M117(R) GP Bomb	MK-81, -82, -83 GP Bomb	MK-82 Snakeye I Bomb	MC-1 Gas Bomb	M129E1 Leaflet Bomb	BLU-31/B Demolition Bomb	BLU-1/B, B/B, C/B Fire Bomb	CBU-24/B, -24A/B, -24C/B	CBU-29/B, -29A/B, -29C/B	CBU-49/B, -49A/B, -49C/B	CBU-24B/B, -49B/B, -52B/B	CBU-53/B, -54/B	BLU-27/B, B/B, C/B Fire Bomb	BLU-32A/B, B/B, C/B Fire Bomb	CBU-58/B, -71/B
M147A1 Nose							X										
M904E1, E2, E3 Nose	X	X	1	X	1	X											
M905 Tail		X		X		X											
M907E1, E2 Nose										X	X	X	X	X			X
M909							X										
FMU-7/B, -7A/B, -7B/B, -7C/B									X						X	X	
FMU-26A/B Electric													X	X			X
FMU-26B/B Electric		X		X									X	X			X
FMU-30/B Electric Nose								X									
FMU-54/B Tail, -54A/B			X		X												
FMU-56/B Proximity													X	X			X
FMU-56D/B Proximity													X	X			X
FMU-72/B Nose & Tail				X													
FMU-107/B							X										
FMU-110/B													X	X			X

NOTE 1 M904E2, E3 Fuze Only.

Figure 1-94. Bomb/CBU – Fuze Compatibility

(All data on page 1-103, including Figure 1-95 deleted.)

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MECHANICAL IMPACT FUZES.

M904E1, M904E2 and M904E3 Nose Fuzes.

The M904E1, M904E2, and M904E3 (figure 1-96) are mechanical impact nose fuzes commonly used with general-purpose bombs. These fuzes are approximately 9-1/3 inches long and 2 inches in diameter at the fuze threads. The difference between the E1 and E2 is the arming delay time. The desired arming time is set on a calibrated dial with selective delay times for the M904E1 of 4, 6, 8, 12, 16, and 20 seconds. The M904E2 has selective delay times of 2, 4, 6, 8, 10, 12, 14, 16, and 18 seconds. The M904E3 has selective delay times of 4, 6, 8, 10, 12, 14, 16, and 18 seconds. The fuze employs an arming vane to effect arming.

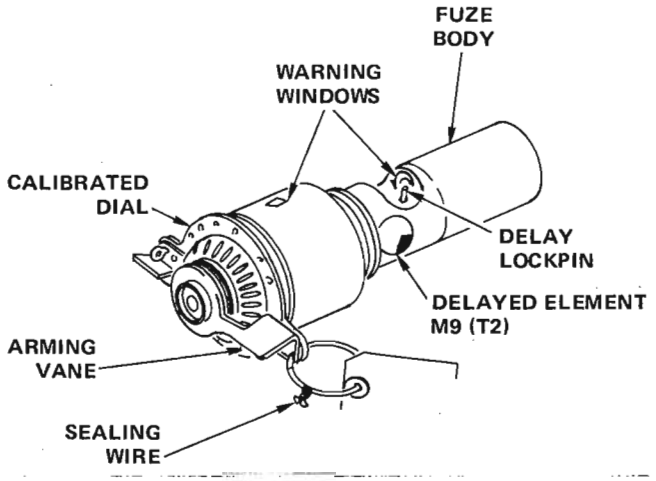


Figure 1-96. M904E1, M904E2 and M904E3 Nose Fuzes

NOTE

When the M904E2 nose fuzes (lot numbers LS-4-33, LS-4-34, and LS-4-35) are used, do not use the 2-second setting. The 4-second setting may be used as long as the "time of flight" for the altitude above the target, as selected from the applicable bomb table, is not less than 6 seconds. These restrictions must be observed because the cited fuzes do not meet design tolerances when set for delays less than 6 seconds.

- M-904-E2 nose fuzes (lot numbers LS-4-36, LS-23-1, LS-24-1, LS-24-4, LS-23-9, LS-31-3, and LS-24-3A) must not be used with the 2-second setting. The 4- through 18-second settings are within tolerance and may be used.

The arming time is independent of release airspeed and is accomplished by the nose vane, a mechanical governor, and a constant-speed rotating gear train. Impact functioning (detonation) delay times are provided by inserting a delay element (M9) in the cavity just beyond the firing pin. The delay elements are available in the following delay increments: instantaneous, and 0.01, 0.025, 0.05, 0.10, and 0.25 seconds. Safety features include a rotor containing the detonator, which is locked out of line with the rest of the explosive train until air arming is completed, and two warning windows. One window is in the fuze body, and one is just above the booster. If the fuze accidentally becomes armed, the arming window in the body shows a red flag. The window above the booster is not visible to the pilot.

WARNING

If the window in the fuze body shows red, the fuze is unsafe and should not be touched. Call explosive ordnance disposal (EOD) personnel immediately.

Fuze arming begins when the bomb is released from the airplane. The arming wire is withdrawn from the vane, and the vane spins in the airstream (operating range is 150 to 600 knots). After the selected arming time has expired, the spring-loaded rotor is permitted to rotate and aline the detonator with the rest of the explosive train. The rotor is locked in position, and the fuze is fully armed.

CAUTION

These fuzes have a manufacturing arming time tolerance of ± 20 percent. The negative tolerance of the fuze must be used when determining the minimum arming separation between weapon and airplane. The positive tolerance must be used to determine the minimum release altitude to insure arming before impact.

When the bomb impacts, the fuze nose assembly moves rearward, causing the firing pin to strike the detonator, which initiates the explosive train.

WARNING

Do not set the arming delay for 2 seconds when using the M904E2 fuze with a M117, GP (retarded) bomb in a low-drag release, or with an MK-82 Snakeye I, GP bomb in a low-drag release, because the airplane will not be beyond the bomb lethal fragment envelope when the fuze arms. Under such a condition, if the bomb were inadvertently released, low drag, from a planned low-slant range, high-drag release situation, the airplane would probably be destroyed by its own bomb effects. Therefore, use an arming delay setting of 4 seconds for both high- and low-drag releases where the in-flight option for high- or low-drag release is planned. In this situation, minimum release conditions that will provide a bomb time of flight in excess of 4.8 seconds should be selected for both high- and low-drag bomb release if low-drag fuze arming is planned.

NOTE

A 2-second setting may be used if either the M117 GP (retarded) or the MK-82 Snakeye I GP bomb is configured to exclude the cockpit selectable low-drag option.

Paragraph M190 Tail Fuze, M14 Primer—Detonator with color codes and figures 1-97 and 1-98 deleted.

M905 Tail Fuze.

The M905 (figure 1-99) is a mechanical impact tail fuze commonly used with general-purpose bombs. It is approximately 6-1/8 inches long and 2 inches in diameter at the fuze threads. Arming is effected by an ATU-35/B arming drive assembly through a flexible shaft, MAU-86/B-2 instead of by an arming vane. Arming time is independent of release airspeed and is accomplished by the arming drive assembly, flexible shaft, mechanical governor, and constant-speed rotating gear train. The desired arming time is set on a calibrated dial with selective delay times of 4, 6, 8, 12, 16, and 20 seconds. Impact functioning (detonation) delay times are provided by inserting a delay element (M9) in the cavity just beyond the firing pin. The delay elements are available in the following delay increments: Instantaneous, and 0.01, 0.025, 0.05, 0.010, and 0.25 second. Safety features include a rotor containing the detonator, which is locked out of line with the rest of the explosive train until air arming is complete, and two warning windows. One window is in the fuze body, and one is just above the booster. If the fuze accidentally becomes armed, the warning window in the body shows a red flag. The window above the booster is not visible to the pilot.

WARNING

If the window in the fuze body shows red, the fuze is unsafe and should not be touched. Call explosive ordnance disposal personnel (EOD) immediately. This fuze must not be used for low-level bombing operations.

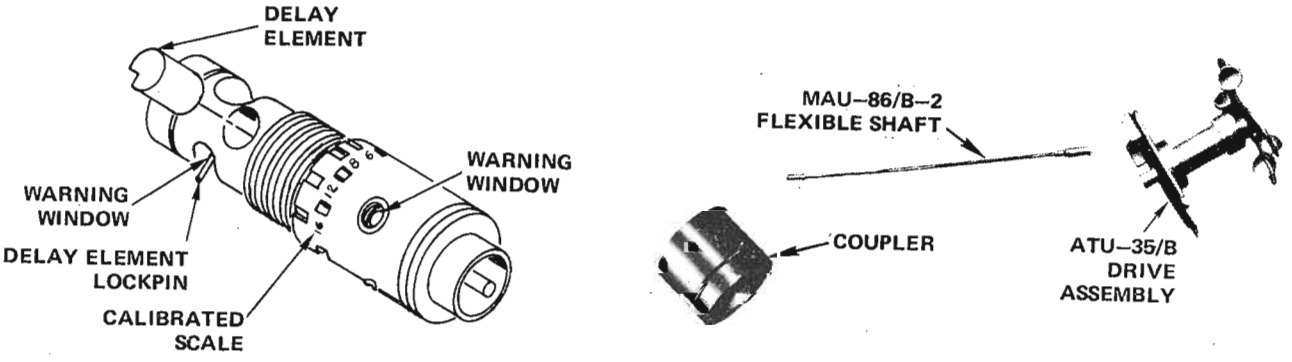


Figure 1-99. M905 Tail Fuze

Fuze arming begins when the bomb is released from the airplane and the arming wire is withdrawn from the vane tab of the arming drive assembly. This permits the vane tab to rotate the inner parts of the fuze (operating range of the fuze is 150 to 600 knots). After the selected arming time has expired, the firing pin is free to move in the direction of flight upon sufficient deceleration of the fuze. An anticreep spring prevents premature movement of the firing pin due to velocity changes of the bomb during freefall. At approximately the same time that the firing pin arms, the rotor containing the detonator is released so that it may rotate by spring action, bringing the detonator in line with the rest of the explosive train. A detent locks the rotor in the armed position, and the fuze is then armed.

CAUTION

The M905 fuze has a manufacturing arming time tolerance of ± 20 percent. The negative tolerance of the fuze must be used when determining the minimum arming separation between the weapon and airplane. The positive tolerance must be used to determine the minimum release altitude to insure arming before impact.

When the bomb impacts on target, the inertia generated by the bomb causes the firing pin assembly to move forward and strike the primer in the delay element, thus initiating the explosive train.

M906 Tail Fuze. (Deleted, including Figure 1-100.)

Paragraph M123A2, M124A2, and M125A2 Tail Fuzes, and Figure 1-101 deleted.

M147A1 Nose Fuze.

The M147A1 (figure 1-102) is a mechanical time nose fuze used to open clustered bombs and the M129E1 leaflet bomb. It is approximately 5.74 inches long and 1.5 inches in diameter at the fuze threads. The desired functioning (detonation) time for an airburst is set on a calibrated dial on the fuze body. The dial may be set at 1/2-second intervals between 5 and 92 seconds. Safety features include an arming pin, an out-of-line detonator, and the safety-block-safe principle. The fuze requires both mechanical arming and time arming to function. Mechanical arming is accomplished by a two-bladed arming vane assembly and a gear train. The time of mechanical arming is dependent upon release airspeed, size of bomb, and release dive angle, and occurs after 260 revolutions of the arming vane. Time arming occurs 4.5 ($\pm$ 1.5) seconds after release, through a timing disk and arming assembly.

Fuse arming, both mechanical and time, begins when the bomb is released from the airplane. As the arming wire is withdrawn from the arming vane, the vane is free to rotate and to turn the arming hub assembly and gear train. This operation releases the safety block after 260 revolutions of the arming vane, and the fuze is mechanically armed. Time arming also commences at release by the withdrawal of the arming wire which permits the arming pin to be spring-ejected. After 4.5 ($\pm$ 1.5) seconds, the out-of-line detonator slider is released. The slider is moved into position by spring action and locked in place by a spring detent. This completes the time arming, and the fuze is fully armed.

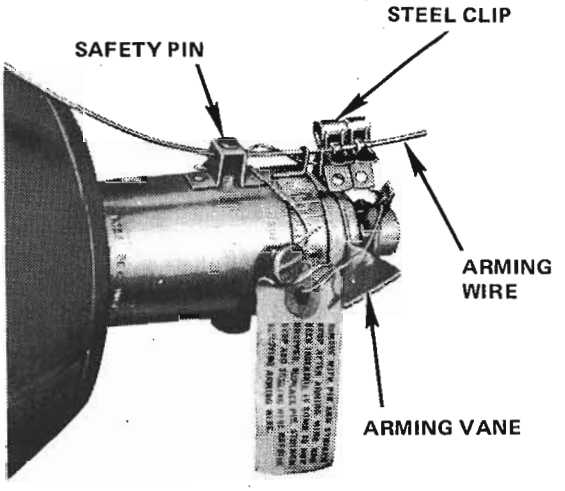


Figure 1-102. M147A1 Nose Fuze

WARNING

Evidence of an armed fuze is indicated by the absence of the safety block, and by failure of the trigger mechanism to position the striker clear of the safety block. If any of these conditions is noted, call explosive ordnance disposal (EOD) personnel immediately.

The functioning of the fuze occurs after the preset time on the calibrated dial has elapsed. A timing disk, using the principle of a common alarm clock (figure 1-103), begins turning at a uniform rate when the arming pin is ejected. After the preset time has elapsed, a spring-loaded firing pin is released and initiates the explosive train. If impact occurs before the set time has expired, the firing pin is driven in, shearing the trigger mechanism and firing the detonator.

Paragraphs M188 Nose Fuze, M914 Fuze deleted.

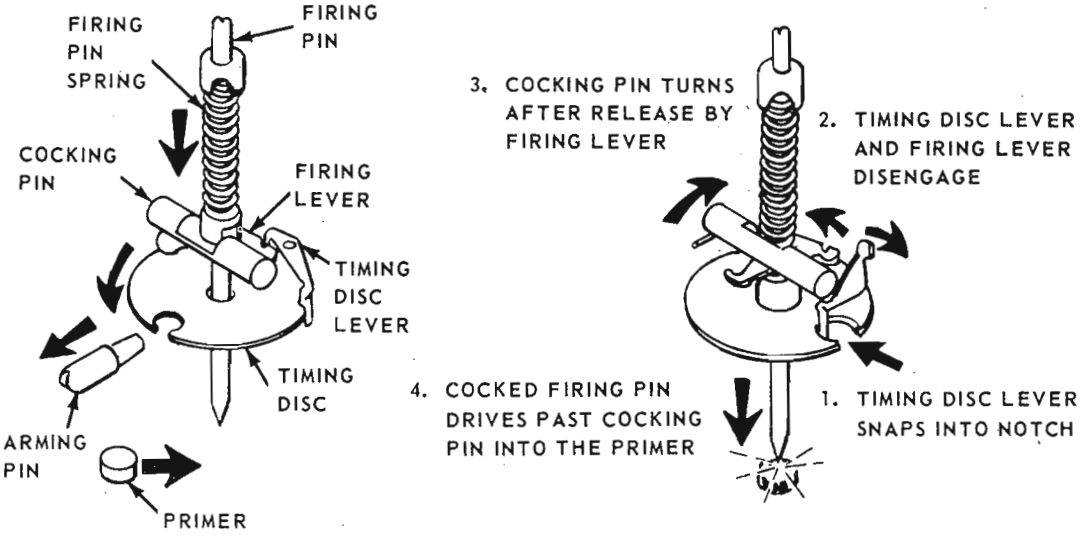

FIRING PIN SPRING
FIRING PIN
COCKING PIN
FIRING LEVER
TIMING DISC LEVER
TIMING DISC
ARMING PIN
PRIMER
3. COCKING PIN TURNS AFTER RELEASE BY FIRING LEVER
2. TIMING DISC LEVER AND FIRING LEVER DISENGAGE
4. COCKED FIRING PIN DRIVES PAST COCKING PIN INTO THE PRIMER
1. TIMING DISC LEVER SNAPS INTO NOTCH

Figure 1-103. Bomb Time Fuze Time Function Cycle

(All data on page 1-110 including Figure 1-104, deleted.)

M907 Series Nose Fuze.

The M907 series nose fuze (figure 1-105) is an air-armed, air-burst, mechanical time fuze with a black powder booster, and is used on certain CBU dispensers. The M907 fuze is attached to the dispenser's nose locking ring. Fuze function times are from 4 to 92 seconds in 0.5 second increments and are set before flight. A governor provides a constant arming rate independent of vane input and function times. The fuze is designed to have an air-burst functioning accuracy of + or -1 second over a temperature range of -50 degrees C to + or -70 degrees C. Upon release from the airplane, the arming wire is withdrawn from the M907 fuze and the fuze-timing and arming cycle is initiated. At the end of the preset time interval, the fuze booster charge is ignited. This charge pressures the chamber of the nose locking ring and forces the ring forward and off the retainer flanges. This unlocks the forward end of the dispenser, and aerodyanmic pressure acting on the dispenser forces the upper and lower sections apart. The aft end plate is bolted to both halves of the dispenser and acts as a hinge until it is ripped loose. At this time, the payload is instantaneously dispersed, and the bombs assume their own trajectories.

M1 Series Fuze Extender.

The 36-inch M1 series fuze extender is shown in figure 1-106. The M1 fuze extender will be used with the M117 GP bomb/M131 fin combination. The MAU-103A/B fin may be used with M1A1 fuze extender configured M117 bombs. Published aircrew procedures and bomb tables for the M117/M131 GP bomb/fin combination will be used for the M117/MAU-103A/B GP bomb/fin combination and for the M117/MAU-103A/B bomb/fin combination with M1A1 fuze extender. Published aircrew procedures for the M117 GP bomb will be used for the M117 GP bomb/M131 fin combination with fuze extender. The bomb tables for the M117 GP bomb/M131 fin combination will be used for the M117 GP bomb/M131 fin combination with fuze extender.

FMU-7 Series Fuze.

The FMU-7 series fuze (figure 1-107) is an electrically armed bomb igniter fuze. It functions through mechanical impact at any angle of impact and can be used as either a nose or a tail fuze. In the BLU-( ) fire bomb, the FMU-7

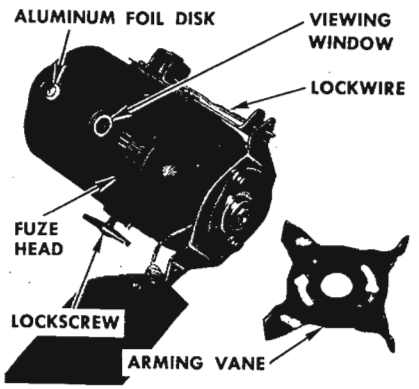


Figure 1-105. M907E1 and M907E2 Nose Fuze

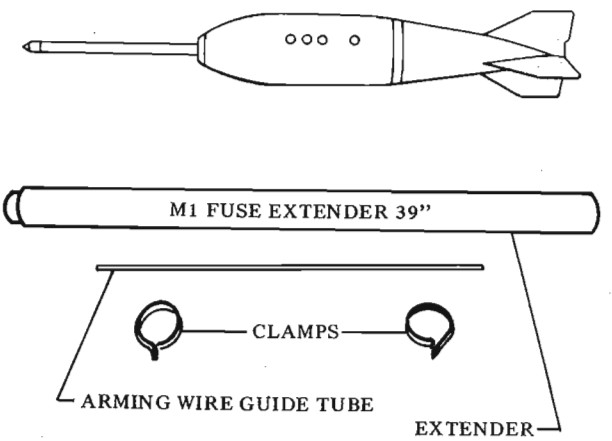


Figure 1-106. M1 Series Fuze Extender

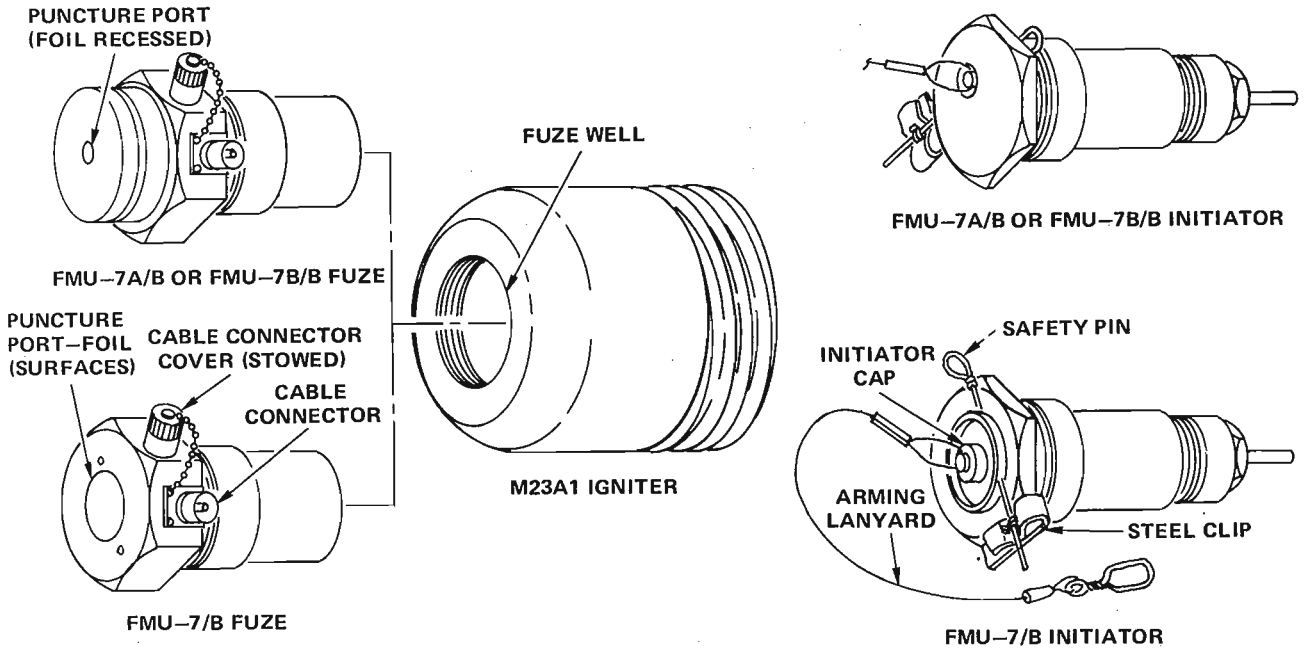


Figure 1-107. FMU-7/B, FMU-7A/B and FMU-7B/B Nose or Tail Fuze

series fuze is enclosed in an AN-M23A1 igniter and forms part of the fuzing network, consisting of an arming lanyard and initiator and electric cabling. The fuze is 1-1/2 inches in diameter at the fuze threads and 5 inches long. Arming is accomplished by the initiator through a spring-loaded firing pin and thermal battery assembly. The fuze functions instantaneously upon impact and has no provisions for delayed functioning. Safety features are of the arming-stem-safe principle. In a safe fuze, the safe-arm pin is recessed below a sheet of thin foil. When the fuze arms, the foil is punctured by the safe-arm pin.

The initiator assembly (figure 1-108) on the top of the fire bomb between the suspension lugs, consists of an arming lanyard, a spring-loaded firing pin, and a 1.5-volt thermal battery. Electric cabling connects the initiator to the fuzes through internal channels in the BLU-( ) fire bomb. (See figure 1-109.) Arming is initiated as the weapon is ejected from the airplane pylon. The arming lanyard (retained by the pylon arming solenoid) pulls the initiator cap from the initiator. As a result, a spring-loaded firing pin is released, forcing it against the primer and activating the thermal battery. After a 0.6-second delay (modified initiator), the battery produces a .1.5-volt pulse. The pulse is passed through the electrical cabling in the BLU-( ) to an arming device in the fuze. The arming device withdraws the arming pin and permits the firing pin to be freed. The fuze is now armed. When the fuze is armed, the safe-arm pin protrudes through the foil to give a visual indication of the fuze condition.

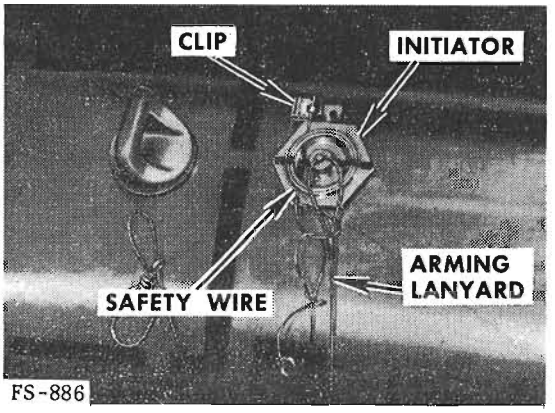


Figure 1-108. Fire Bomb Initiator Assembly

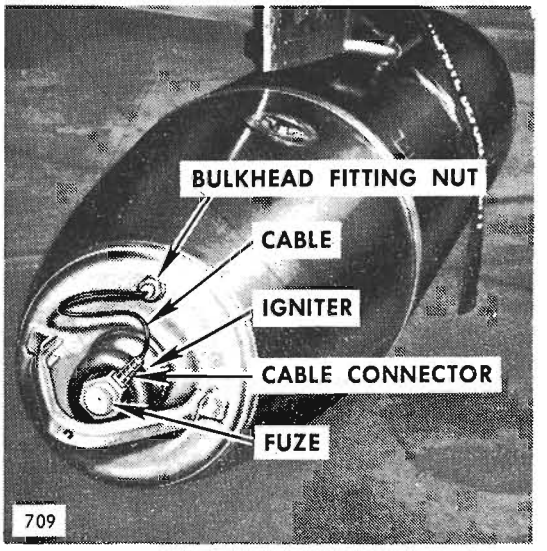


Figure 1-109. BLU Fire Bomb Electric Cabling

WARNING

If the safe-arm pin protrudes through the foil in the center of the fuze head, treat fuze as armed. Do not touch fuze. Notify explosive ordnance disposal (EOD) personnel immediately.

M23 (AN-M23A1) IGNITER. The M23 (AN-M23A1) igniter (figure 1-107) is approximately 3-7/8 inches in diameter and 3-7/8 inches long. It is cylindrical in shape and rounded at one end. In the rounded end is a fuze well designed to receive the FMU-7 bomb fuze. The body of the igniter is filled with 1-1/4 pounds of white phosphorus (WP).

WARNING

The white phosphorus in the igniter liquifies at 44 degrees C and may leak through the filler plug if exposed to high temperature. Leaking igniters can be determined by the presence of smoke and/or flame or by the presence of white material on the igniter. If any of these conditions is observed, notify explosive ordnance disposal (EOD) personnel immediately.

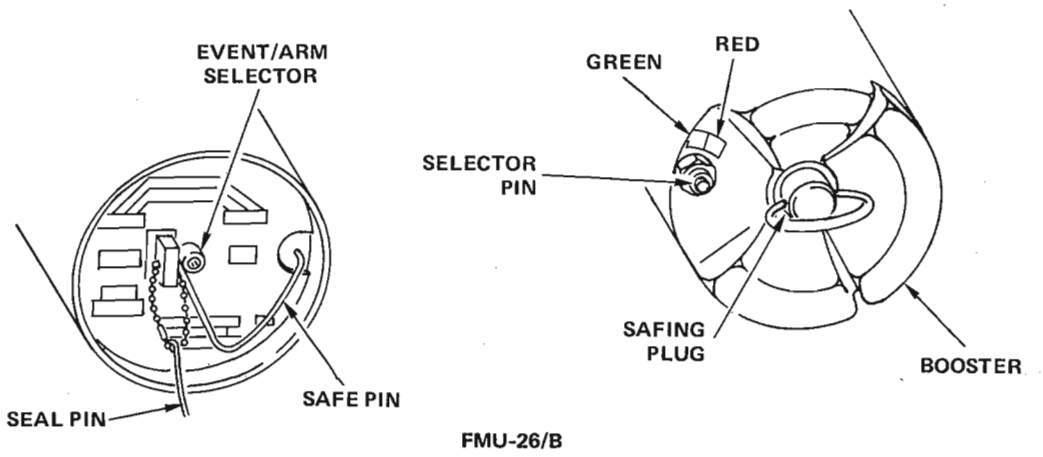
FMU-26 Series Multipurpose Fuze.

The FMU-26 series multipurpose fuze (figure 1-110) can be used in a nose or tail configuration in the M117 GP, MK-81, MK-82, MK-83, or BLU-31/B bomb. The FMU-26A/B and FMU-26B/B can be used with the CBU-24B/B, CBU-29B/B, CBU-49B/B, CBU-53/B and CBU-54/B dispensers. The fuze is approximately 6-1/2 inches long and 3 inches in diameter. A battery firing device (BFD) and lanyard assembly are in the nose or tail fuze well. The lanyard passes through the internal plumbing. A lanyard lock in the internal (charging) plumbing well is secured by a locknut. The BFD enters the plumbing until clips at the BFD latch over the nut. The swivel and loop are placed on the lanuard before the free end of the lanyard lock is secured. The key lanyard lock is for securing the lanyard to the lanyard lock. A safe plug, placed in the fuze during shipping, is removed just before the fuze is installed in the fuze well. In the fuze well, the fuze with booster attached mates with the BFD. A retainer fits against the fuze, with two tabs in the spanner slots of the well. Other tabs of the fuze retainer are between the fuze and fuze well. A safe pin blocks the fuze rotor in the out-of-line position until after the fuze is installed. The safe pin is then removed and replaced with a seal pin that prevents moisture from entering the fuze. The fuze nose plug is threaded into a closure ring that secures the fuze in the well. The booster end of the fuze accepts the 45-gram RDX booster, and has a recess for mounting the safety switch.

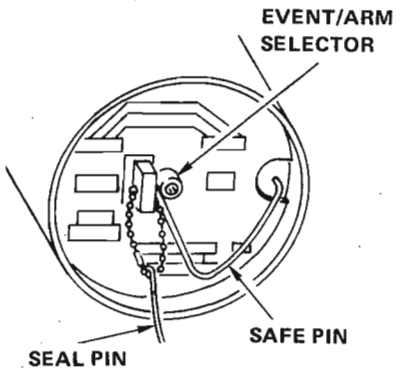
CAUTION

Since the fuze settings may not be visible for pilot inspection, armament personnel shall be carefully briefed on the required settings.

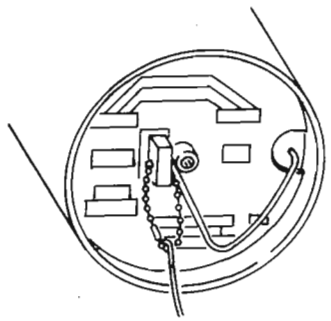
The fuze is activated upon armed release. The swivel and loop assembly is held by the arming solenoid and remains with the airplane. The lanyard is attached to, and falls with, the bomb. This causes the lanyard to be pulled with a force greater than 36 pounds, that cocks and releases the firing pin which initiates the fuze thermal battery to provide electrical power for fuze operation. Fuze timing and



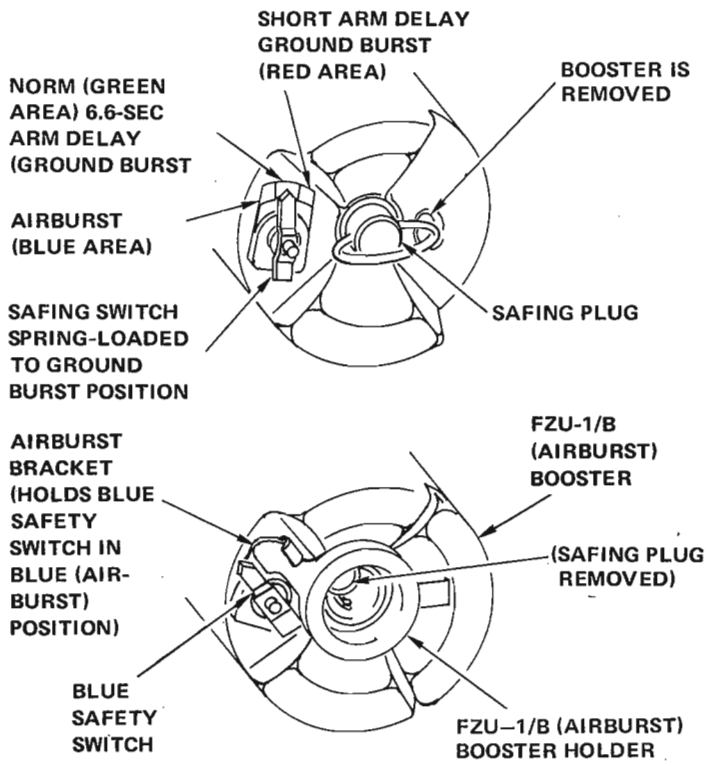
FMU-26/B



FMU-26A/B



FMU-26B/B


SHORT ARM DELAY GROUND BURST (RED AREA)
BOOSTER IS REMOVED
NORM (GREEN AREA) 6.6-SEC ARM DELAY (GROUND BURST
AIRBURST (BLUE AREA)
SAFING SWITCH SPRING-LOADED TO GROUND BURST POSITION
SAFING PLUG
AIRBURST BRACKET (HOLDS BLUE SAFETY SWITCH IN BLUE (AIR-BURST) POSITION)
FZU-1/B (AIRBURST) BOOSTER
(SAFING PLUG REMOVED)
BLUE SAFETY SWITCH
FZU–1/B (AIRBURST) BOOSTER HOLDER

FMU-26A/B AND FMU-26B/B

Figure 1-110. FMU-26/B, FMU-26A/B and FMU-26B/B Nose or Tail Fuze

counting circuitry provides an arming signal at the set arming time. The arming signal arms the fuze by rotating the detonator from its out-of-line position to an in-line (firing) position. The fuze timing and counting circuitry also provides the firing or final event signal at the set event times for after-impact and airburst functions. Fuze modes, available arming, and final event times are as follows:

MODE	ARMING TIME	FINAL EVENT TIME	EVENT TOLERANCE
Airburst 1 (FMU-26A/B and FMU-26B/B only)	Selectable 1.9 to 99.9 sec in 0.5 sec increments	Selectable Occurs 0.1 sec after arming.	±0.3 sec

NOTE

The arming time tolerance for the short-delay mode is ±0.30 second. With this mode, the minimum allowable bomb time of flight (to prevent duds) will be the arming delay setting plus 0.30 second.

- The fuze contains a safing device which duds the fuze if impact occurs prior to arming.

Impact 2 Short-delay	Selectable 2.0 to 20.0 sec in 2.0 sec increments	Selectable Nondelay, 0.010, 0.020, 0.050, 0.100, or 0.250 sec	±10% or 0.002 sec, whichever is greater

WARNING

When using the medium-delay mode, select minimum release altitudes that will provide safe separation from bomb fragments for instantaneous or contact bursts. This is required to protect the airplane and crew in the event of a premature bomb detonation at initial impact. To prevent ricochet and a possible airburst during the ricochet, release conditions for general-purpose bombs should provide a trajectory angle at impact in excess of 40 degrees.

Impact 3 Medium-delay (FMU-26/B and FMU-26A/B only)	Fixed 1.0 sec after release	Selectable 6.0, 10.0, 12.0, 16.0, or 20.0 sec	±0.25 sec

The fuze contains a safing switch that duds the fuze if an impact occurs before arming.

CAUTION

Rough handling of the fuze after it is removed from the shipping container, and especially during the installation when the safe plug is removed, could result in a dud fuze. The munition handling and loading personnel shall be cautioned not to mishandle the fuze or install a fuze that has been inadvertently dropped.

FMU-26/B Fuze.

The FMU-26/B fuze has safety switch at the booster end which is normally set to the green position. In this position, the firing circuit to the detonator is not enabled until approximately 6.6 seconds after release. The safety switch should be kept in the green position for all medium-delay or skip mode settings, and for all short-delay or dive mode settings except when operational delivery conditions are such that the time of bomb flight to impact will be less than 6.6 seconds. For release where the bomb time of flight to impact is less than 6.6 seconds, the safety switch shall be set to the red position to obtain fuze event function at the set time.

The FMU-26A/B and FMU-26B/B fuzes are an FMU-26/B with a functional airburst mode. The blue safety switch position enables the airburst function. The switch is spring-loaded so that it will not remain in the blue position unless it is held there by the airburst bracket which fits around the FZU-1/B (airburst) booster. Unless this switch is held in the blue position, the fuze will not function airburst. If a fuze placed in an HE bomb is inadvertently set in the airburst mode, it will detonate at impact through the back-up circuit.

WARNING

Do not set the arming delay for 2 seconds when using the FMU-26( ) fuze with an M117 GP (retarded) bomb in a low-drag release, or with an MK-82 Snakeye I GP bomb in a low-drag release, because the airplane will not be beyond the bomb lethal fragment envelope when the fuze arms. Under such a condition, if the bomb were inadvertently released, low-drag, from a planned low-slant range, high-drag release situation, the airplane would probably be destroyed by its own bomb effects. Therefore, use an arming delay setting of 4 seconds for both high- and low-drag releases where the in-flight option for high- or low-drag release is planned. In this situation, minimum release conditions that will provide a bomb time of flight in excess of 4.8 seconds shall be selected for both high and low-drag bomb release if low-drag fuze arming is planned.

NOTE

A 2-second setting may be used if either the M-117 GP (retarded) or the MK-82 Snakeye I GP bomb is configured to exclude the cockpit selectable low-drag option.

FMU-30/B Nose Fuze.

The FMU-30/B nose fuze (figure 1-111) is used in the standard 3-inch-diameter fuze well of the BLU-31/B landmine. The fuze contains a battery power supply, an electronic assembly composed of electromagnetic timers and sequential logic circuitry, an electromechanical arm/safe mechanism, a rotor-mounted detonator with an out-of-line position, and a pressure detection system. The pressure detection system consists of an amplifier and three piezoelectric sensors under sensor covers in the nose forging. An externally mounted booster is used with the fuze to enable it to initiate the high explosive in the landmine. All FMU-30/B fuzes are shipped with the target selector in the No. 1 position. If any other position is required, the pipe plug shall be removed and the desired position selected. Refer to Classified Supplement, T.O. 1F-100D(I)-34-1-1B, for additional information on the FMU-30/B fuze.

WARNING

If the color visible through the arm/safe indicator window on the side of the nose forgoing is green, the fuze is safe. If the red color is visible, the rotor may have become unlocked and the fuze shall be considered armed. In this event, the fuze shall not be used. Do not touch fuze, and notify explosive ordnance disposal (EOD) personnel immediately.

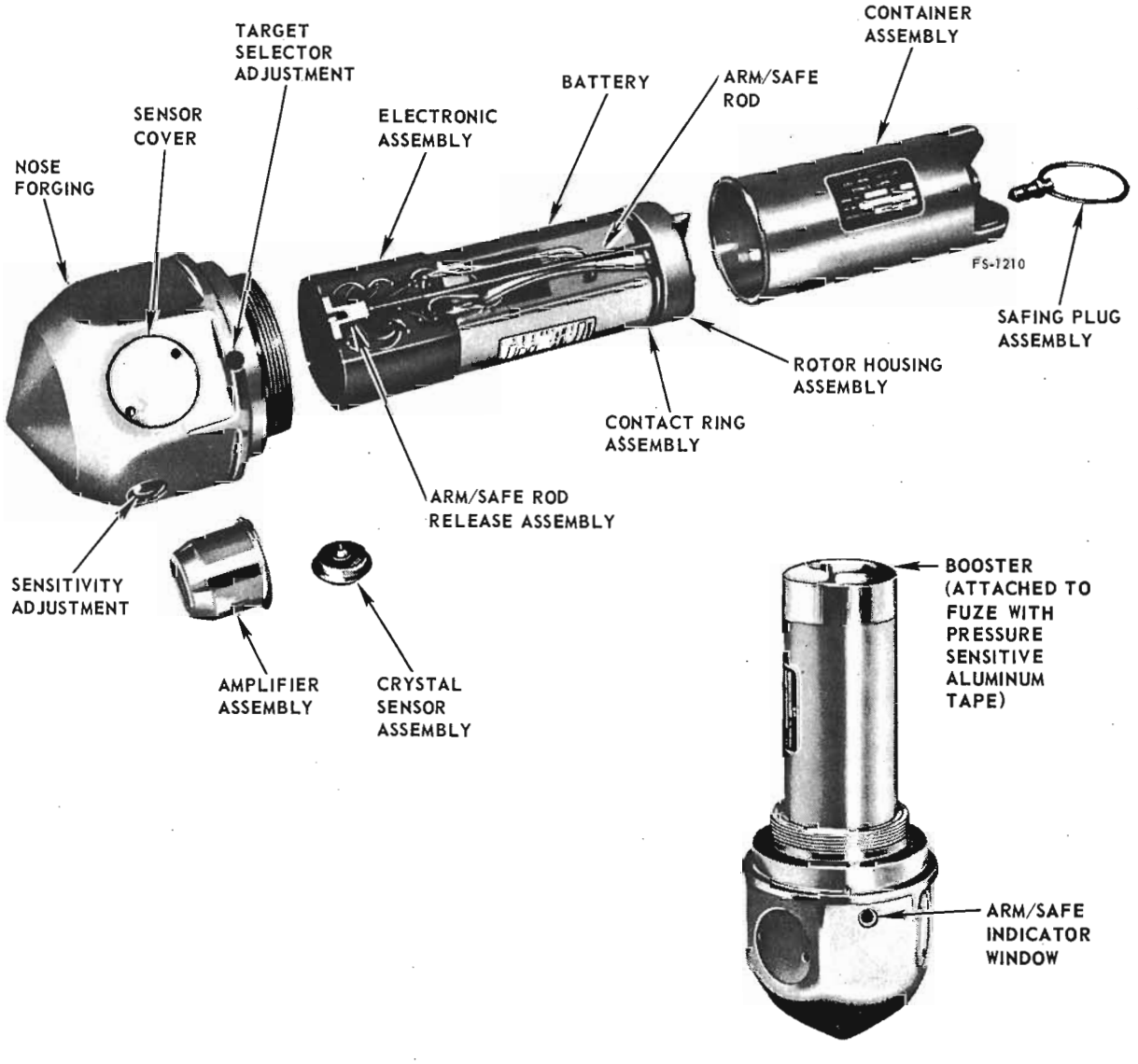


Figure 1-111. FMU-30/B Nose Fuze

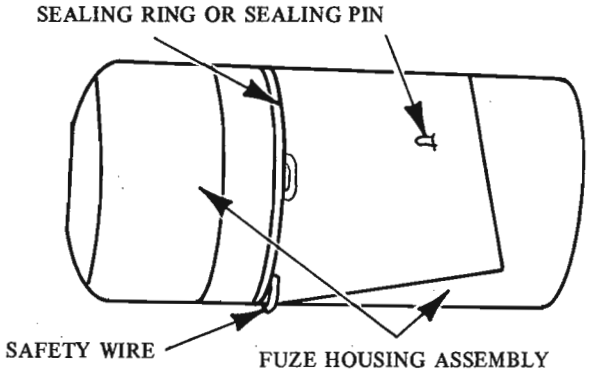


Figure 1-112. FMU-54/B Tail Fuze

FMU-54/B Tail Fuze.

The FMU-54/B tail fuze (figure 1-112) is used in the M117 GP (retarded) bomb and in the MK-82 Snakeye I GP bombs. It is a mechanically operated retardation-sensing device with a predetermined arming delay of 0.75 to 3.50 seconds, settable in 0.25-second intervals. Upon release, the bomb fin initiates the fuze arming cycle and provides a safe escape distance. If the fin should not open properly, the fuze will not arm. A properly armed fuze functions upon impact when a G-weight releases the spring-loaded firing pin. The fuze is mechanically initiated by a lanyard connected to the pylon swivel. As the bomb falls, the lanyard pulls the fuze lanyard engaging shaft to release the fuze components to operate if proper retardation is experienced. The lanyard is attached to, and falls with, the bomb. As the bomb falls, the lanyard pulls the fuze lanyard engage shaft and releases the fuze components to operate. When retardation of 3.5 (± 0.5) G is felt, the commit weight frees the main G-weight, which moves to its full travel. The G-weight, connected to the timing block by two springs, pulls the timing block through a delay assembly. Upon reaching the end of its travel, the timing block releases the timer verge locking pin, allowing the timer to operate and arm the fuze in the preset period of time. The timing block takes 0.6 seconds to reach its full travel. If at any time during this 0.6 second retardation is lost, the G-weight will revert to its original position and not arm the fuze. If the fuze has not armed before impact, a fail-safe G-weight functions upon impact and allows a pin to block the path of the slider assembly to prevent arming. If the fuze becomes armed during the drop and the firing pin G-weight unlocks upon impact, the G-weight will slide forward and release the springloaded firing pin. The firing pin strikes the detonator, and the explosive propagation continues through the lead cups to the booster.

The FMU-54/B fuze requires a 0.6 second sustained G-loading in the front to rear direction to arm. An initiated fuze can be subjected to repeated impacts from the front, but will not arm unless the impacts are of 0.6-second or longer duration. If fin failure occurs during fin opening, the retardation time is insufficient to arm the fuze. If the fins have not functioned properly, the fail-safe G-weight will function upon impact and prevent arming during retardation experienced during impact.

NOTE

Since the fuze settings are not visible to the pilot for inspection, the minimum handling and loading personnel shall be carefully briefed on required settings and the red warning tag procedures.

WARNING

To assure adequate escape in the event of premature airburst detonation, the FMU-54/B arming delay setting shall be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate arming time for the FMU-54/B fuze to arm prior to impact.

FMU-56 Series Fuze.

The FMU-56 series fuze (figure 1-113) is a self-powered Doppler radar proximity fuze used to open a free-falling munitions cluster bomb unit (CBU) of the CBU-24B/B type within the proximity of selected targets. The fuze is constructed in two cylindrically shaped sections. The smaller section fits into the fuze well of the munition and the larger section protrudes externally. The FMU-56( ) has provisions for presetting fuze arming time and munition dispenser height of burst. The FMU-56/B proximity fuze is an altitude sensing fuze with 9 settings available for burst altitude and 9 safe separation settings (2 to 18 seconds in increments of 2). Burst settings are made in the fuze prior to installation in the munition; safe separation settings may be made after the fuze is installed in the munition. The FMU-56A/B fuze has 10 settings available for burst altitude and 9 safe separation settings (3 to 18 seconds). Burst and safe separation settings can both be made after the fuze is installed in the munition. The available burst height settings are listed in the Confidential Supplement to this manual.

The available switch positions and corresponding safe separation times for the arming time selector are listed in table 1-1.

FMU-56/B		
Switch Position		Arming Time (sec)
Alpha	Numeric	
S	0	Safe
A	1	2
B	2	3
C	3	4
D	4	6
E	5	8
F	6	10
G	7	12
H	8	14
J	9	18

FMU-56 A/B	
Switch Position	Arming Time (sec)
X	Safe
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
18	18

Table 1-1.

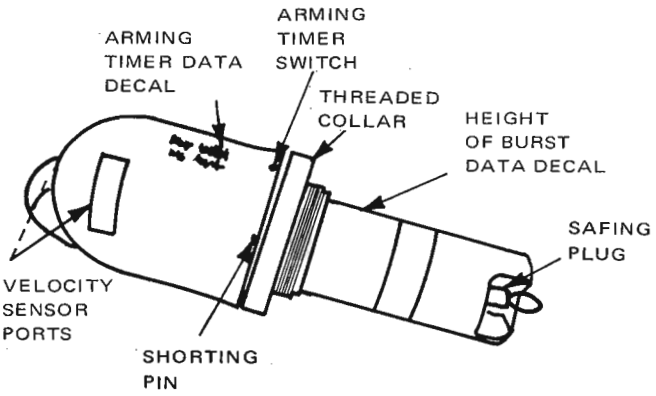


Figure 1-113. FMU-56/B Proximity Fuze

CAUTION

Use of a minimum safe separation setting of 4 seconds is recommended for all release situations, except for release of the CBU-24B/B, CBU-29B/B, and CBU-49B/B munitions with the FMU-56( ) proximity fuze, to assure adequate aircraft/munition separation distance at cluster opening time. The minimum safe separation time setting of 3 seconds is recommended for the release of the CBU-24B/B, CBU-29B/B, and CBU-49B/B munitions with the FMU-56( ) proximity fuze.

The fuze subassembly is the major component of the FMU-56( ) and contains the Doppler ranging radar, battery, and safing and arming device. The fuze subassembly is equipped with two safety devices which are removable; a safing plug which is removed before loading and a shorting pin which is removed before flight. Construction consists of a drawn steel cylinder to which a threaded aluminum collar and a plastic radome are attached. A retainer clip attached to a depression in the rear of the steel cylinder holds one Booster, Fuze FZU-1B. The threaded collar secures the fuze assembly in the CBU fuze well.

Booster, Fuze FZU-1/B, hereinafter called the booster, contains five grams of M5 propellant in a metal container topped by a foam filler. The booster is attached to the rear of the fuze assembly and separates the nose cap from the CBU when ignited.

The battery firing device consists of a machined steel initiator, a retaining clip and a lanyard of steel cable. The lanyard is routed through the CBU lanyard tube and attached to the outside of the CBU and to the aircraft

munitions rack through the swivel and link assembly. The initiator is held in the fuze well of the CBU by the retaining clip. The fuze subassembly is positioned over the initiator, locating it in a manner which allows the initiator firing pin to strike the battery primer when the lanyard is pulled.

The swivel and link assembly consists of a wire ring, link, and swivel. The oval end of the assembly is for attachment to the aircraft munitions rack. The battery firing device lanyard is threaded through the round end.

When the CBU is released from the launch aircraft, the swivel and link assembly pulls on the battery firing device lanyard, actuating the battery device. The firing pin of the battery firing device initiator strikes the battery primer, igniting the battery which applies power to the fuze circuitry and starts the arming timer. The arming timer runs for its preset time, at the end of which the fuze will arm provided the velocity sensor switch is closed.

When energized, the radar circuitry of the fuze is continually checking the CBU's height above the ground and the vertical component of its velocity with respect to the ground. The height above the ground is measured by determining the time required for the radar pulse to reach the ground and return to the fuze. The closing velocity of the CBU is determined from the amount of Doppler shift in the returned signal with respect to the fuze's internal reference oscillator. When the height above ground, as measured by the fuze, is the same as the height of burst, and the closing velocity of the munition is greater than a predetermined minimum value, the detonator fires through the booster ignition port of the fuze housing setting off the booster. Detonation of the booster pushes the FMU-56( ) and munitions canister nose cap out of the munitions canister allowing it to separate into two pieces and disperse its contents.

In order for the FMU-56( ) to arm, the following sequence of events must occur.

1. The SAFING PLUG must be removed from the fuze assembly.

2. The battery must be ignited.

3. The SHORTING PIN connected as a short across the battery must be removed.

4. The ARMING TIMER SWITCH must be set to a position other than "O".

5. Air flow sensed by the VELOCITY SENSOR ports at the expiration of safe separation time must exceed 150 knots.

When installed in the rear of the fuze subassembly, the safing plug locks the safing and arming rotor in the SAFE position. With the safing plug in place the battery cannot be ignited.

If the battery is ignited while the shorting pin is installed in the proper receptacles, the battery will be shorted to ground and will discharge.

When the arming timer switch is set to the "O" position, the safe separation timer will not run and the safing and arming device will not receive an "arm" signal and will remain in the SAFE position.

When the velocity of air sensed at the velocity sensor ports is less than 150 knots, the switch will remain open, breaking the arm circuit to the safing and arming device.

NOTE

Since the fuze height-of-burst and arming time selector switch positions are set by the load crew, the munitions handling and loading personnel must be carefully briefed on the required settings.

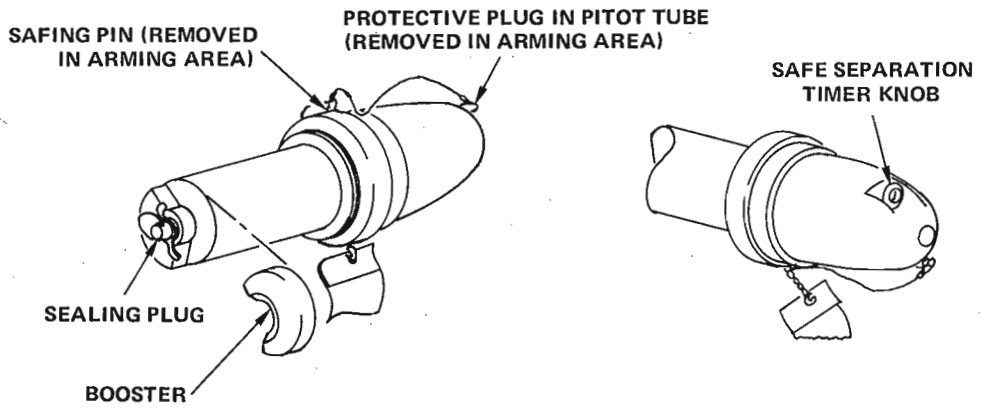

SAFING PIN (REMOVED IN ARMING AREA)
PROTECTIVE PLUG IN PITOT TUBE (REMOVED IN ARMING AREA)
SAFE SEPARATION TIMER KNOB
SEALING PLUG
BOOSTER

Figure 1-114. FMU-57/B Fuze

FMU-57/B Fuze.

The Bomb Nose Proximity Fuze FMU-57/B (figure 1-114) is cylindrically shaped, approximately 4.5 inches in diameter and 13.9 inches in length. The fuze is designed to be physically compatible with bombs with 3-inch nose fuze wells and internal plumbing. At this time, only two lanyard assemblies are packed for each fuze – one of 16-inch length for M117 and MK 81 bombs and one of 24-inch length for MK 82 bombs. (Additional-different length lanyard assemblies may be procured at a later date if the requirement for FMU-57/B use with other GP bombs is established.) The FMU-57/B bomb fuzes are designed to burst in the air at a specified 30-foot height above the target (or ground). A selector switch on the fuze radome permits the selection of a safe (SF) position or one of nine safe-separation times. These are 4, 5, 6, 7, 8, 10, 12, 14, and 18 seconds, and they allow the bomb to drop safely away from the aircraft before the fuze becomes armed.

Upon release of the bomb from the aircraft, the lanyard assembly is pulled and stretched. When a pull of 65 lbs. is reached, the spring-loaded initiator assembly is triggered and an explosive impact starts the action of the thermal battery. Upon reaching an operating level, the battery powers the electronic delay circuits. After the safe-separation time (manually selected at installation) has elapsed, the proximity circuits are placed in operation. When the bomb is within the specified distance from the target, the bellows actuator is operated, and an explosive rotates the safing and arming device. Closing the safing and arming device contacts initiates a detonator which, in turn, initiates the booster and the main charge.

The external components of the FMU-57/B are the radome, a housing assembly, a container assembly, a booster assembly, a sealing plug assembly, and a safing pin assembly.

When using proximity fuzes, it is imperative that the fuzes be kept unarmed until the releasing aircraft has attained adequate safe escape distance from the munition. This is required to assure that the delivery aircraft will not be hit by lethal fragments from its own munition in the event of a premature detonation at the expiration of the safe arming time. The required safe arming times in tables 1-2, 1-3, 1-4, and 1-5 are listed as a function of release conditions and escape maneuvers, These values are applicable for use with FMU-57/B fuzed MK 81, MK 82, MK 83 or M117 munitions.

Use the information listed in the safe arming time tables to determine the required safe arming time for the planned release mode (i.e., singles, pairs, salvo, or ripple) release conditions and escape maneuver. If fractional arming time values are derived, round off to the next highest second value to obtain the FMU-57/B safe-separation time setting. In the determination of the minimum release altitude (after the determination of the FMU-57/B safe-separation time setting), check the appropriate bombing tables, dive recovery charts, and safe escape charts to be sure that the planned release condition provides sufficient bomb time of flight to satisfy all fuze arming, safe escape, and ground clearance during recovery requirements.

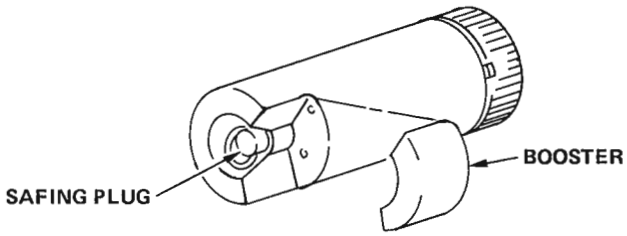


Figure 1-115. FMU-72/B Fuze

FMU-72/B Fuze.

The FMU-72/B fuze (figure 1-115) is compatible with the nose and/or tail fuze wells of all bombs with internal plumbing and the standard 3-inch fuze well. These bombs are the:

a. M117, 750-pound, GP Bomb
b. MK 81, 250-pound, GP Bomb
c. MK 82, 500-pound, GP Bomb
d. MK 83, 1000-pound, GP Bomb

The FMU-72/B can be used either in the nose or tail fuze well. Settings must be made prior to installing the fuze in the fuze well. If a change in a setting is required after installing the fuze, it must be removed from the bomb to make the change.

CAUTION

Since the fuze settings are not visible to the pilot for inspection, the munitions handling and loading personnel must be carefully briefed on required settings.

The FMU-72/B fuze is activated upon armed release. The swivel and link assembly is held by the arming solenoid and stays with the aircraft. When the bomb is released, the lanyard is pulled. This pull (greater than 36 pounds) cocks and releases the firing pin which initiates the liquid fuze operation. The arming circuitry provides a fixed delay for the signal for arming. The arming signal is used to arm the fuze, that is, rotate the detonator from the out-of-line position to the in-line or firing position. To assure that the detonator does not fire at arming, it is grounded until impact occurs, and the power source which fires the detonator is not charged until 33 seconds after impact. The fuze timing and counting circuitry provides the firing or final event signal at the set event time after impact. The arming time and selectable event times are listed below:

a. Arming Time: 6.0 seconds with tolerances of +1.5 to -1.0 seconds.

b. Event Times: Selectable in 20-minute increments from 20 minutes to 5 hours; 1-hour increments from 5 hours to 16 hours; 2-hour increments from 16 hours to 30 hours; and 3-hour increments from 30 hours to 36 hours.

WARNING

When the FMU-72/B fuse is used in general purpose bombs, select minimum release altitudes which will provide safe escape from bomb fragments for instantaneous or contact bursts. This is required to protect the aircraft and aircrew in the event of a premature bomb detonation at initial impact. To preclude ricochet, release conditions for general purpose bombs should provide a trajectory angle at impact in excess of 40 degrees.

The fuze contains a safing switch which duds the fuze in the event impact occurs prior to arming.

NOTE

To assure adequate time for the FMU-72/B fuze to arm prior to impact, use the minimum release altitudes as specified in the fuze arming time tables for the M904E2/M905 fuze with a 6-second arming delay setting.

Table 1-2. Low Altitude Level Release – 4.0 G Pullup or 4.0 G 60 Degrees Banked Turn Escape Maneuver

WARNING

The values listed in table 1-2 are applicable for use with singles, pairs, or salvo type releases only and assume that the aircraft attains the 4.0 G escape maneuver acceleration within 2 seconds after release. If a low altitude level ripple release is to be accomplished where the aircraft is held straight and level throughout the entire ripple release time cycle, the safe arming times listed for a level release-level constant speed escape maneuver should be used and minimum release altitudes selected accordingly.

RELEASE TAS KTS	SAFE ARMING TIME – SECONDS M117, MK82, MK81	MK83
400	4.8	4.9
500	4.2	4.4
600	4.2	4.2

Table 1-3. Low Altitude Level Release – Level, Constant Speed Escape Maneuver

RELEASE TAS KTS	SAFE ARMING TIME – SECONDS M117, MK82, MK81	MK83
400	7.8	8.5
500	6.9	7.4
600	6.0	6.0

Table 1-4. Low to Medium Altitude Dive Release – 4.0 G Pullup to 20 – 30 Degrees Climb Escape Maneuver

WARNING

The values listed in table 1-4 are applicable for the same singles, pairs, or salvo type release and escape maneuver condition described above. For timed ripple releases, where the aircraft remains in a fixed dive angle flight condition until the last bomb is released, the safe arming time should be increased by an amount equal to the ripple time cycle.

RELEASE TAS KTS	DIVE ANGLE DEG	SAFE ARMING TIME – SECONDS M117, MK82, MK81	MK83
400	15	4.7	4.8
	30	4.7	4.8
	45	4.7	4.7
500	15	4.2	4.5
	30	4.2	4.5
	45	4.2	4.5
600	15	3.8	4.1
	30	3.8	4.1
	45	3.8	4.1

Table 1-5. High Altitude Level Release – Level Escape Maneuver

NOTE

The lower air density at high altitudes is responsible for the increase in required safe arming time for high altitude releases. A linear interpolation between the safe arming time values listed for 10,000, 20,000, and 30,000 feet may be accomplished to determine the required safe arming time value for intermediate altitudes.

RELEASE		SAFE ARMING TIME – SECONDS	
ALTITUDE ABOVE TARGET FT	TAS	M117, MK82, MK81	MK83
10,000 or lower	400	8	9
	500	7	8
	600	6	7
20,000	400	11	12
	500	9	11
	600	8	10
30,000	400	13	14
	500	11	13
	600	10	12

NONNUCLEAR TRAINING WEAPONS AND EQUIPMENT

BDU-33B/B Practice Bomb. The BDU-33B/B practice bomb (figure 1-116) has and elongated, tear-shaped body and acruciform type fin assembly welded to the center tube. A conical after body is welded to the center tube and rollcrimped to the aft end of the bomb body. A firing pin assembly, signal cartridge and/or signal cartridge and inertia tube are inserted in the tail end of the bomb. A safety device (cotter pin and tag) is inserted between the firing pin and signal cartridge during build-up and handling prior to flight.

Physical Characteristics:

a. Weight	24 pounds
b. Length	23 inches
c. Diameter	4 inches

MK-106 Practice Bomb. The high-drag MK-106 practice bomb (figure 1-116) is constructed of steel, weighs 5 pounds, is 19 inches in length, and is 4 inches in diameter. The bomb has an inner cylinder, and outer cylinder, and a fin assembly. The bomb utilizes the MK-4 Mod 3 bomb spotting charge in the inner cylinder. A box-type fin assembly, consisting of four metal vanes welded together, is welded to the aft end of the inner cylinder. One of the two indexing holes in the bomb mates with the indexing pin in the bomb ejector saddle pad when the bomb is loaded in the SUU-21/A dispenser.

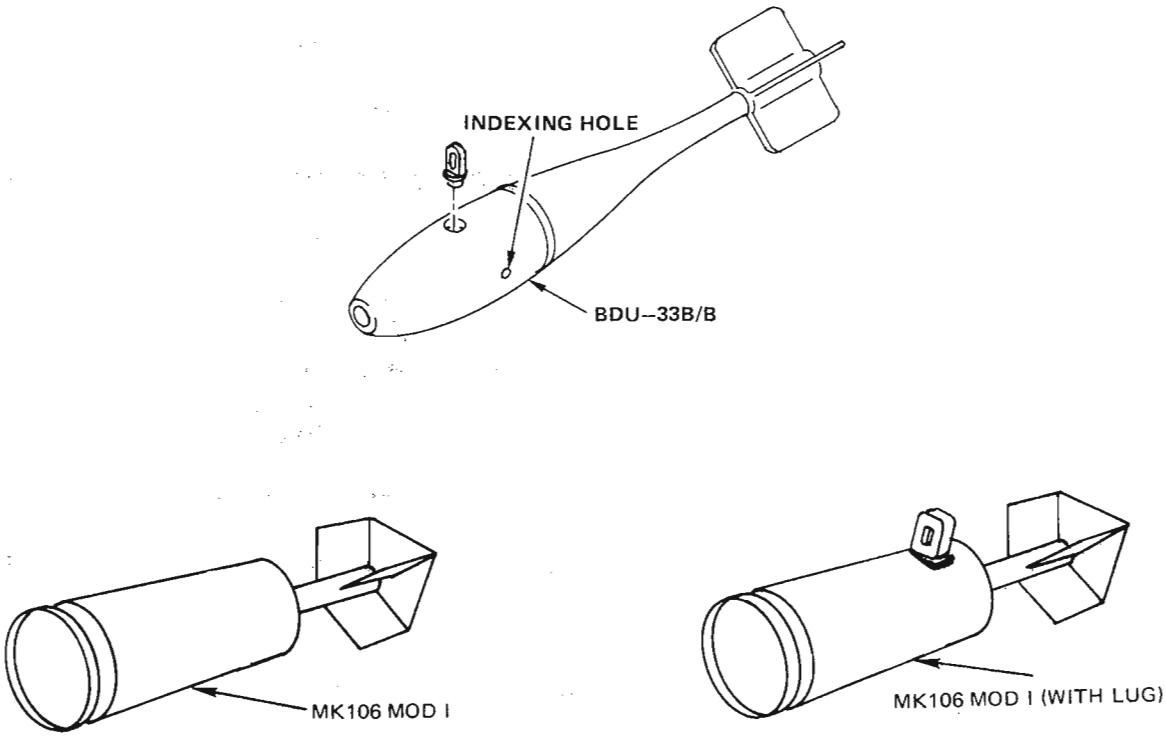


Figure 1-116. Practice Bombs

SUU-20/A, /A(M), A/A, B/A Dispenser (figure 1-117) is an aerodynamically clean, externally mounted pod with rocket launching and bomb dispensing capability. It is compatible with pylons having 14-inch lug spacing between suspension hooks. Two electrical plug openings are located fore and aft on the upper surface of the dispenser to accommodate adapter cables to mate with multiple- and triple-ejector-rack pylons. The dispenser has a low-drag profile with an elliptical cross section. It is 122 inches long and 19.3 inches wide. The loaded (six BDU-33( ) bombs and four rockets) dispenser weighs approximately 455 pounds. Empty weight is approximately 240 pounds. The SUU-20/A(M) and 20A/A are almost identical to the SUU-20/A. It is approximately 90 pounds heavier, has an external hardback section, and has a fiberglass nose and tail fairings.

Six training bombs are held in individual bomb ejector guns, and are stabilized by sway braces and bomb retention arms. The ejector gun is a rod and piston assembly operating within a breech housing and driven by gas pressure produced by an electrically fired ARD-863-1 ejector cartridge. The bomb retention arms are locked in the loaded position by a compression spring. Ejection of the bomb is accomplished by the cartridge gases forcing the seat downward, overpowering the spring tension, driving the retention arms open, and allowing the piston to eject the bomb. The bomb ejecting sequence is:

1. Left front
2. Right rear
3. Right front
4. Left rear
5. Left center
6. Right center

Bomb retaining locks fitting around the bottom side of each BDU-33( ) bomb and attached to the ends of the retention arms by quick-disconnects are provided as a mechanical safety device to prevent inadvertent bomb release. A bomb intervalometer, located on the undersurface forward of the No. 1 bomb station, provides bomb single, ripple (100-millisecond interval), and salvo release options. The intervalometer shall be set prior to takeoff for the planned mode of release. A bomb/rocket circuit safety clip prevents inadvertent bomb/rocket release by interrupting the firing circuits in the dispenser.

Four rocket tubes, 84 inches long, are provided, two on each side of the dispenser. The 2.75-inch FFAR can be loaded into the tubes from either end of the dispenser. Each rocket is held in place by a detent and a spring-loaded electrical firing probe located at the rear of each tube. A rocket intervalometer, similar to the bomb intervalometer, is located on the undersurface of the dispenser forward of the No. 3 bomb station. It provides a choice of rocket single, ripple (100-millisecond interval), or salvo release mode, and should be set prior to takeoff.

CAUTION

When both rockets and bombs are carried, the rockets must be fired before selecting bombs. Attempting to drop bombs first will result in firing the rockets simultaneous with release of the first bombs.

The dispenser contains a bomb circuit and a rocket circuit for directing the release pulse to the respective intervalometer. The conventional airplane bombing circuits cannot be used because the dispenser is locked into the bomb racks, and these circuits would normally open the locks, thus releasing the dispenser. An electrical relay in the chemical and SUU-7A circuit permits a single weapon circuit other than the conventional bomb circuit to release bombs or rockets at the discretion of the pilot. The dispenser is equipped with a single electrical cable to connect to the pylon plug either through the forward or aft/dispenser receptacle; depending on the location of the existing pylon connector. The forward receptacle is used for the intermediate station configuration, and the aft receptacle is used for the outboard station.

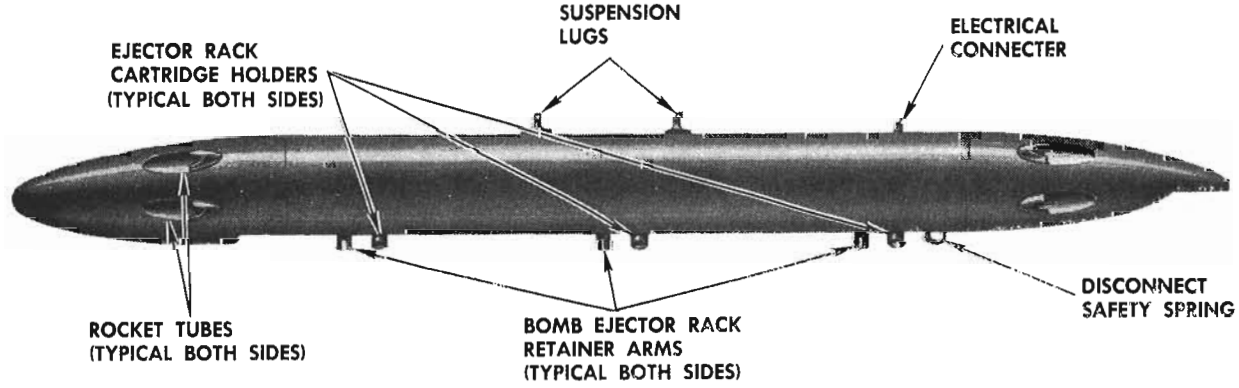

SUSPENSION LUGS
ELECTRICAL CONNECTER
EJECTOR RACK CARTRIDGE HOLDERS (TYPICAL BOTH SIDES)
DISCONNECT SAFETY SPRING
ROCKET TUBES (TYPICAL BOTH SIDES)
BOMB EJECTOR RACK RETAINER ARMS (TYPICAL BOTH SIDES)

Figure 1-117. SUU-20/A, /A(M), A/A, B/A Dispensers

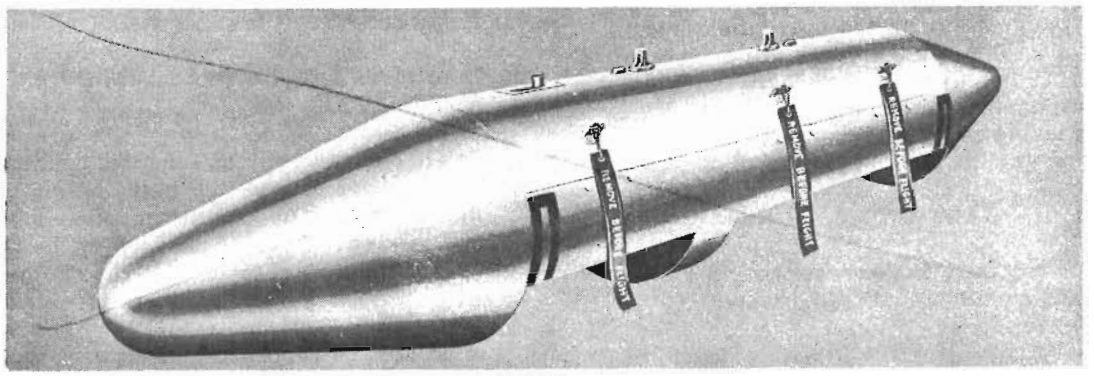


Figure 1-118. SUU-21/A Practice Dispenser

SUU-21/A dispenser (figure 1-118) is a practice bomb-carrying device used in nonnuclear weapon delivery training. It may be carried on either the centerline or the left intermediate stations. The SUU-21/A contains six spring-loaded ejector-mechanisms permitting up to a six-bomb release during one sortie. The act of loading a practice bomb forces the ejector plunger upward, compressing a spring until toggle arms snap into a cocked position around the bomb, securing it to the ejector. As the ejector operates (cocking or releasing), an indicator pin extends from the side of the dispenser near the ejector being loaded, then retracts within the dispenser contour. A red-flagged safety stop guard is inserted into a slot over the indicator pin hole to prevent pin emergency and subsequent release of a bomb-loaded ejector. The safety stop guard must be removed before flight. The bombs are released singly in a sequence determined by a circuit selector within the dispenser. This release sequence can begin with any of the ejector positions by manually positioning the rotary switch on the dispenser relay box (figure 1-119) before takeoff. Dispenser door sequencing is determined by a two-position dispenser door mode selector switch on the relay box. The desired position, MANUAL or AUTOMATIC, must be selected before takeoff to obtain desired door operation.

The SUU-21/A dispenser may be configured to carry six BDU-33/B, BDU-33A/B, or MK-106 practice bombs. Mixed loads of these bombs may be carried, if each ejector mechanism is configured for the particular practice bomb to be loaded at that station. The SUU-21/A with six BDU-33/B bombs or six BDU-33A/B bombs weighs 638 pounds. With six MK-106 bombs; it weighs 518 pounds. The dispenser is 156 inches long and 17 inches in diameter.

The 28-volt dc power required for SUU-21/A bomb bay door operation is furnished through the DCU-9/A control panel or the DCU-117/A weapon test control panel. Proper sequencing of the DCU-9/A or DCU-117/A option selector switch opens the dispenser bomb bay doors. After the doors are open, normal operation of any of the bomb release systems results in bomb ejection. If the manual mode has been selected on the relay box, the SUU-21/A doors remain open after bomb ejection.

CAUTION

To prevent a failure in the relay box, the bomb button should not be held down after bomb release.

The dispenser doors may be closed at pilot discretion by proper sequencing of the DCU-9/A or DCU-117/A option selector switch. After a bomb is released in the automatic mode, the warning light flashes as the doors start to close and goes out when the doors are fully closed. The option selector switch must be properly sequenced to open the doors for another release. Sequencing of the option selector switch to reposition the doors to either the close or the open position can be accomplished any time the warning light is not flashing.

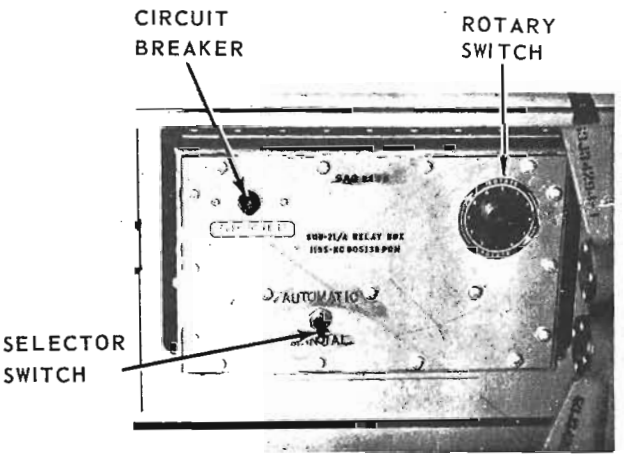


Figure 1-119. Rotary Switch on Dispenser Relay Box

The DCU-9/A control panel (figure 1-120) is used with the airplane wiring to monitor and control the SUU-21/A dispenser.

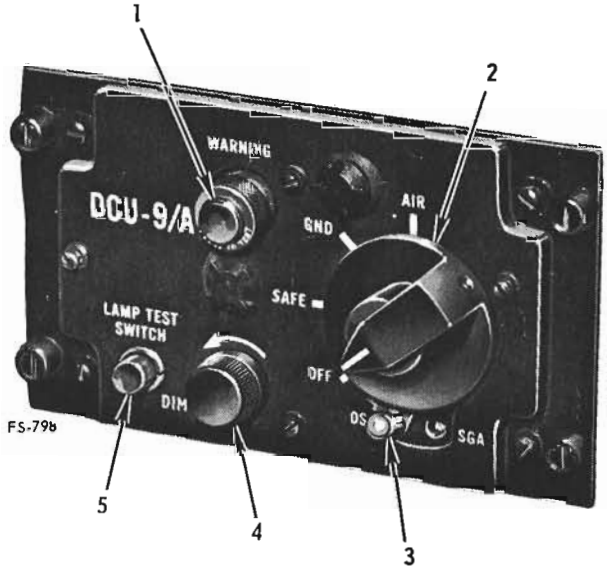
CONTROL ARM. The control arm prevents inadvertent operation of the DCU-9/A option selector switch. The control arm has two positions: OS (OFF, and SAFE) and SGA (SAFE, GND, and AIR). The control arm may be safety-wired and sealed in the OS position. When the control arm is in the OS position, the option selector switch may be rotated to either the OFF or the SAFE position, but cannot be rotated to the GND or AIR position. To rotate the option selector switch to the GND or AIR position, it is necessary to rotate the option selector switch to SAFE and then place the control arm in the SGA position. The option selector switch may then be rotated to GND or AIR, and back to SAFE, but cannot be rotated to the OFF position.

OPTION SELECTOR SWITCH. The DCU-9/A option selector switch has four positions: OFF, SAFE, GND, and AIR. The OFF position of the switch isolates the bomb circuits by removing dc power from the DCU-9/A. Rotation of the option selector switch to the SAFE position supplies dc power to the DCU-9/A control panel. Selection of the GND or AIR position energizes the SUU-21/A bomb bay door actuators.

WARNING LIGHT. The warning light is a press-to-test light on the DCU-9/A panel. The light comes on when pressed, to indicate that the stud pullout plugs are properly installed and that the bomb release transfer relay is routing the bomb release pulse to the dispenser. The warning light also monitors the position of the SUU-21/A doors. The light burns steadily when the doors are full open, and flashes when the doors are in transit.

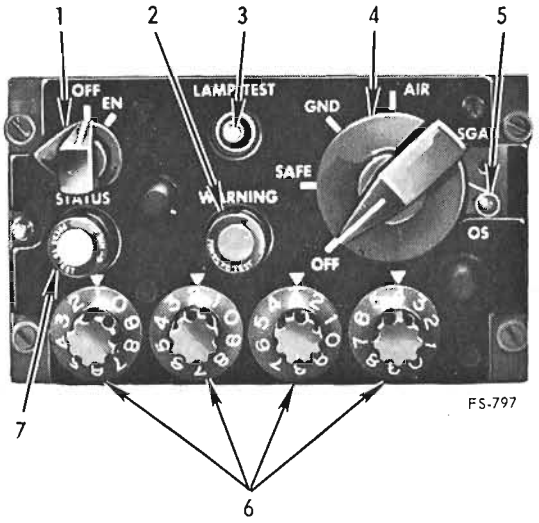
LAMP TEST SWITCH. The lamp test switch determines the condition of the warning light bulb.

DIM CONTROL. The dim control knob has no function on these airplanes. The panel lights are controlled by the console rheostat on the lighting control panel.



1. WARNING LIGHT
2. OPTION SELECTOR SWITCH
3. CONTROL ARM
4. DIM CONTROL
5. LAMP TEST SWITCH

Figure 1-120. DCU-9/A Control Panel



1. ENABLE SELECTOR SWITCH
2. WARNING LIGHT
3. LAMP TEST SWITCH
4. OPTION SELECTOR SWITCH
5. CONTROL ARM
6. CODE SELECTOR SWITCHES
7. STATUS LIGHT

Figure 1-121. DCU-117/A Weapon Test Control Panel

The DCU-117/A control panel (figure 1-121) is used with the airplane wiring to monitor and control the SUU-21/A dispenser.

CONTROL ARM. The DCU-117/A control arm functions in the same manner as described under DCU-9/A operation.

OPTION SELECTOR SWITCH. The DCU-117/A option selector switch functions in the same manner as described under DCU-9/A operation.

WARNING LIGHT. The DCU-117/A warning light functions in the same manner as described under DCU-9/A operation.

LAMP TEST SWITCH. The lamp test switch is for simultaneously checking the condition of the warning light and status light bulbs.

ENABLE SELECTOR SWITCH. The enable selector switch, code selector switches, and status light have no function in the control of the SUU-21/A.

Circuit Breakers. The following circuit breakers on the left console special store circuit-breaker panel (figure 1-122), are required for operation of the SUU-21/A through the DCU-9/A or DCU-117/A:

a. Special store relays No. 1, 2, and 3.
b. Special store panel.

Figure 1-122. Special Store Circuit Breaker Panel

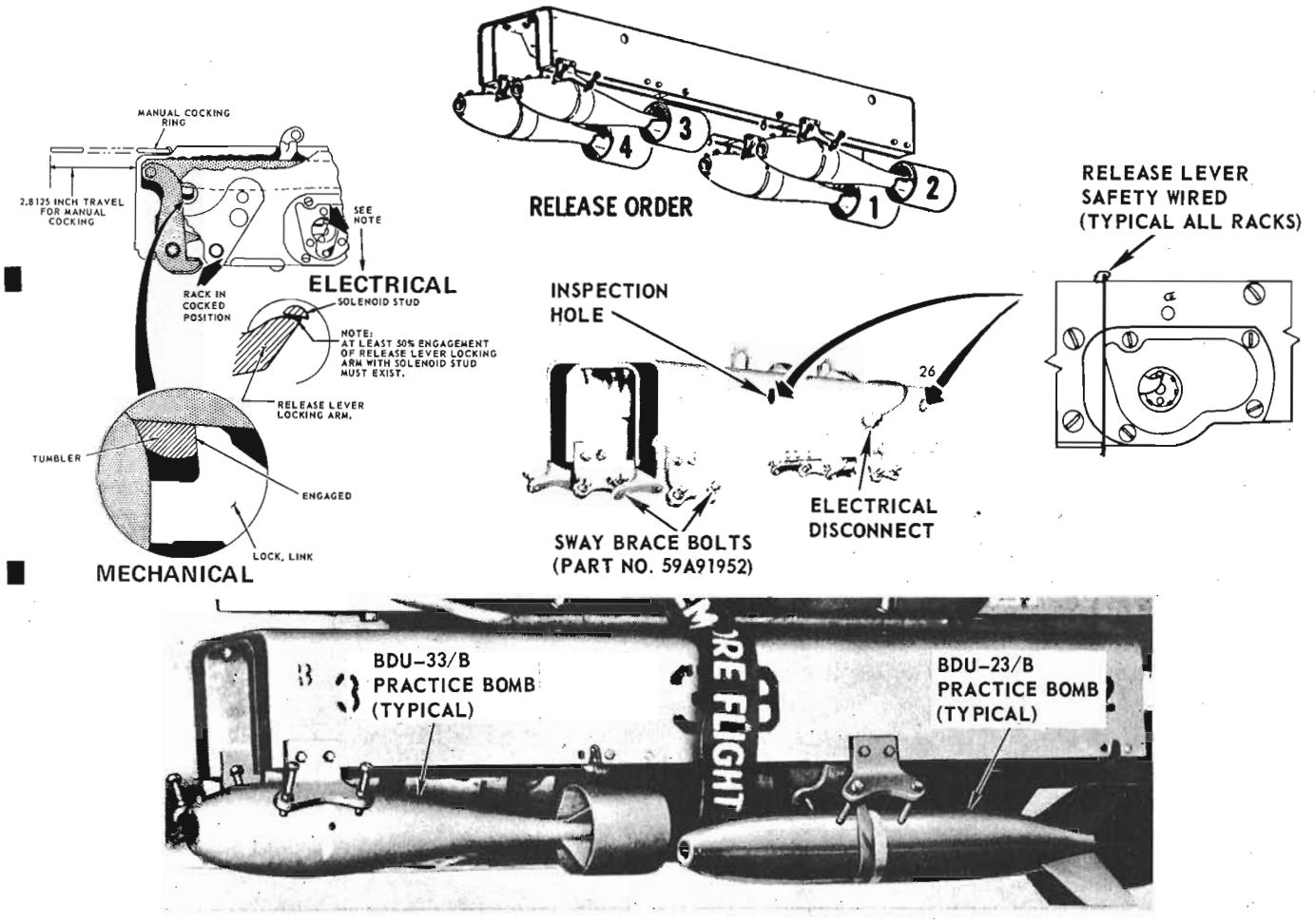


Figure 1-123. AF/B37K-1 Practice Bomb Container

AF/B37K-1 practice bomb container (figure 1-123) is for the carriage and release of BDU-33( ), or MK-106 practice bombs. Any of the bombs may be loaded on any station in any combination. The bomb container has four electromechanical bomb racks internally installed. Each rack has a mechanical release as well as an electrical release. Each rack has four sway-brace bolts attached to the container body; to aline and secure each bomb after it is loaded on the container. The U-shaped bolts, spaced 14 inches apart, are attached to the container top for standard suspension. An electrical harness and plug connect to the airplane bomb release circuitry. A transfer switch in the container bomb rack circuitry transfers the electrical release impulse from one rack to another when the circuit is deenergized and then reenergized. The sequential order of bomb release by rack is right rear, left rear, left front, and right front. Two inspection holes allows visual inspection of the tumbler, link lock, rack release lever locking arm, and solenoid locking pin to determine whether the MA-4A rack is fully cocked (electrically and mechanically). The AF/B37K-1 with four BDU-33( ) bombs weighs 186 pounds. With four MK-106 bombs, it weighs 106 pounds. The container is 46 inches long, 9.13 inches wide, and 6 inches in height.

CAUTION

The solenoid pin engagement with the release lever locking arm assembly should not be under 0.060 inch (minimum or over 0.095 inch (maximum). These tolerances indicate the engagement to be at least 50 percent and indicate a safe lock condition.

The bombs are released through the armament selector switch with a release option of BOMB SINGLE only. Each succeeding activation of the bomb button releases the next bomb in sequence.

NOTE

The AF/B37K-1 dispenser is not formally authorized for use on the F-100 series aircraft, except for class I modifications.

A/A37U-15 Tow–Target System. The A/A37U-15 tow-target system (figure 1-124), for air launching, towing, and releasing a high-speed dart target, is used in air-to-air gunnery training. The system consists of a TDU-10/B dart target and a tow-target pod containing a two-reel assembly within the center section. A boom and launcher for carrying the dart target are attached to the left upper side of the pod. A parachute recovery unit for recovering the dart target may be used with this system. The assembled tow-target system components are carried at the left outboard wing station on a type III series pylon. The complete system weighs 825 pounds. The pod is 157 inches long and 18 inches in diameter. The dart target is 16 feet long, and 5 feet wide and 5 feet high at the rear span.

The target assembly (TDU-10/B aerial dart target) consists of four fins or wings mounted in a cruciform pattern on an aluminum keel, two suspension lugs, an adjustable balance weight, and a bridle assembly. The wings are constructed of wood and honeycomb paper covered with aluminum sheeting. The balance weight, on the nose of the target, may be adjusted to compensate for varying target tow speeds. A bridle assembly is attached to the keel of the target.

The two-target pod is a Fiberglas fairing designed to aerodynamically streamline the tow-reel assembly. An electrical connector and two suspension lugs (spaced 14 inches apart) on top of the pod provide for mechanical and electrical connection to the pylon. Access doors on the bottom of the pod are for inspection and installation of the tow-reel assembly and explosive squibs in the cable-cutter mechanisms. A duct in the forward section of the pod directs air for cooling the tow-reel assembly braking unit during cable reel-out.

NOTE

During preflight, check that the Fiberglas body is not cracked, broken or damaged.

Two inspection holes allows visual inspection of the tumbler, link lock, rack release lever locking arm, and solenoid locking pin to determine whether the MA-4A rack is fully cocked (electrically and mechanically).

The tow-reel assembly comprises a frame assembly with a removable tow reel. The squib-actuated cable-cutter mechanisms are at the rear of the frame assembly.

NOTE

Check that the tow cable is tightly wound on tow reel and secured in position with cloth tape.

WARNING

Improper routing of the tow cable may prevent normal release of the dart target.

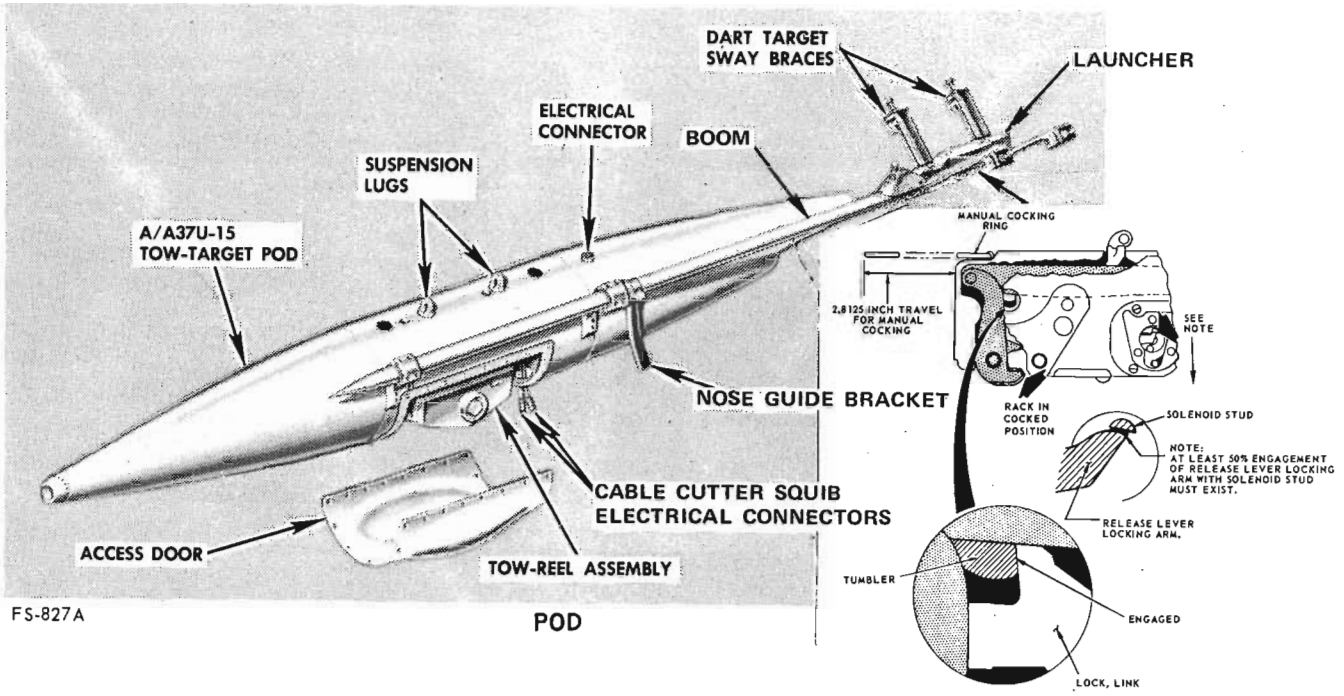
This tow reel is a one-way reel capable of carrying approximately 2,300 feet of 11/64-inch-diameter armored cable or 5,000 feet of 1/8-inch-diameter cable. Incorporated in the tow reel is a self-energized inertial brake, actuated by flyweights on the reel drum. The brake permits reel-out of the tow cable at a predetermined rate. The tow cable is routed through two cable-cutter mechanisms. At completion of the towing mission, an electrical signal from the airplane ignites a squib that actuates the primary cable cutter. In case of a malfunction, the alternate cable-cutter mechanism squib may be ignited by a separate electrical signal from the airplane. The tow cable is severed, and the target is released. A nylon rope, approximately 25 feet in length, connects the tow cable end loop to the target bridle loop. The rope is used to decrease the initial shock that occurs when the dart target is launched from the airplane. The boom and launcher, mounted to the left side of the pod, secure the dart target to the tow-target pod during airplane flight before launch. An adjustable target nose guide is attached to the boom to prevent lateral displacement and to limit the vertical movement of the dart before launch. The launcher, which consists of a standard 14-inch boom rack enclosed within a housing stablized by four sway braces, is mounted on the rear of the boom. The boom rack, actuated electrically by a signal from the airplane, contains a mechanical release mechanism for use by ground personnel. The sway braces are fitted with adjustable pads positioned to support the dart target wings and to prevent lateral oscillation of the dart target.

NOTE

During preflight, look through launcher rack inspection hole and check engagement of rack release lever locking arm and solenoid locking pin to ascertain that the rack is fully cocked.

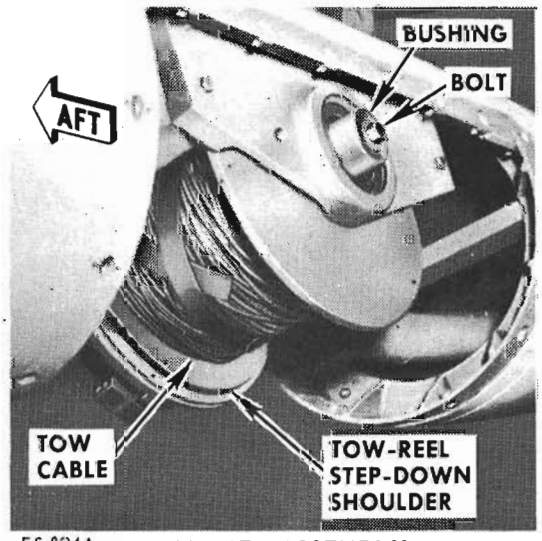
A parachute recovery system, consisting of a canister, a 14-foot parachute, and a canister lid, may also be used. The cylindrical canister has two fasteners for connecting the tow cable and nylon rope. The parachute D-ring is also connected to the forward fastener. When installed, the canister is attached to the tow-target pod with cloth tape and serves as a link between the tow cable and nylon rope. The canister lid is designed with two aerodynamically actuated levers. When the tow cable is severed at completion of the towing mission, the tow cable trails behind the dart and causes the canister to reverse its normal position, actuating the canister lid levers to separate the lid from the canister. The lid, fastened to the top of the parachute, then serves as a drogue to deploy the parachute.

The A/A37U-15 tow target is controlled by the armament system circuitry.



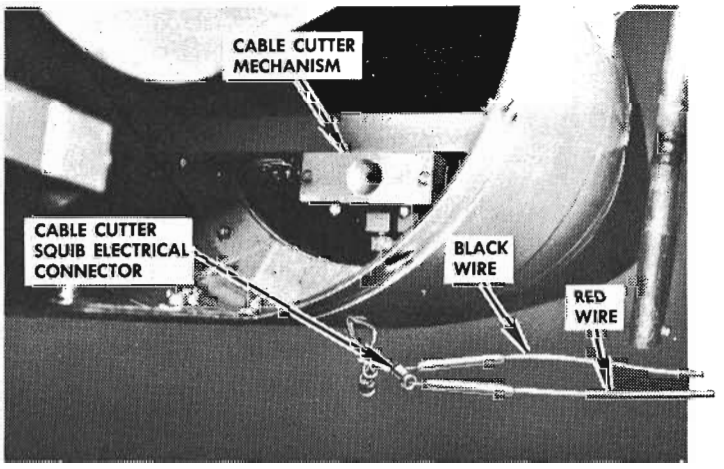
FS-827A

POD



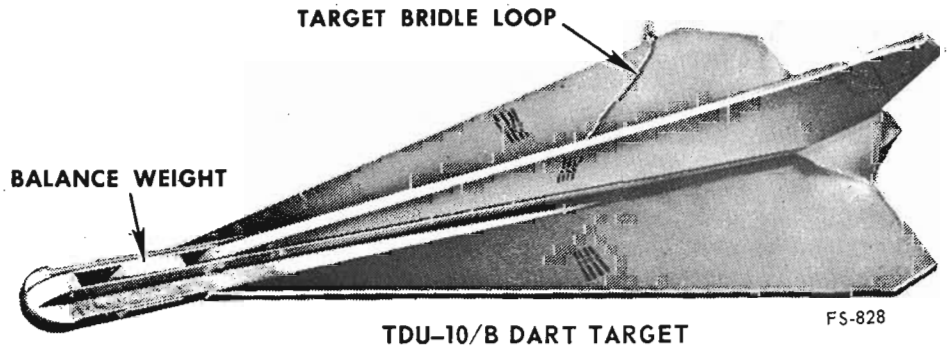
FS-824A

TOW REEL ASSEMBLY



FS-825

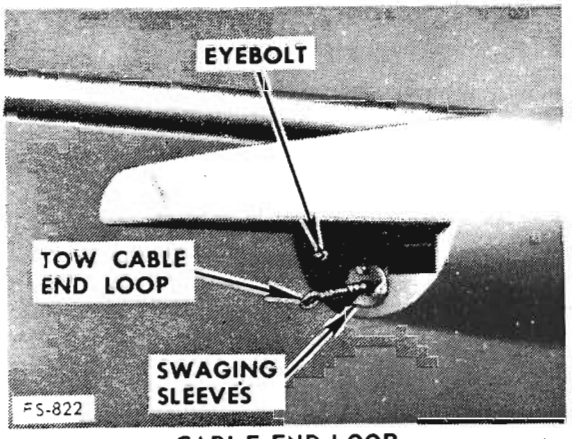
CABLE CUTTER ASSEMBLY



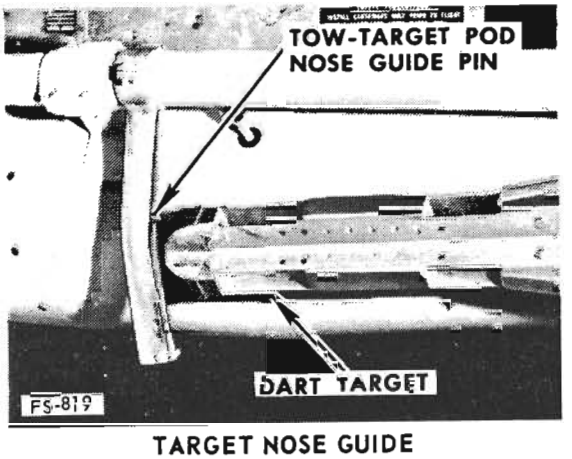
FS-828

TDU-10/B DART TARGET

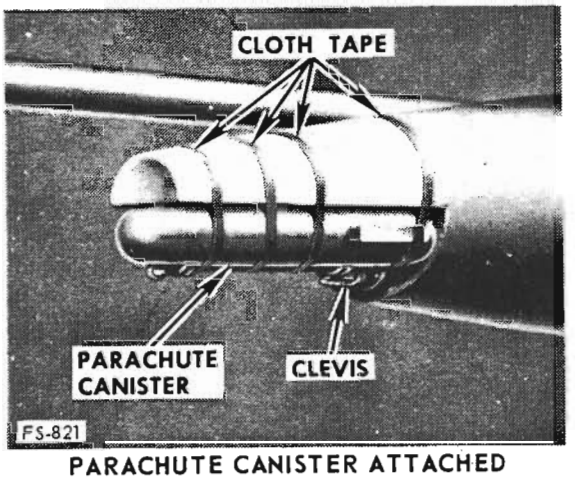
Figure 1-124. A/A37U-15 Tow Target System (Sheet 1 or 2)



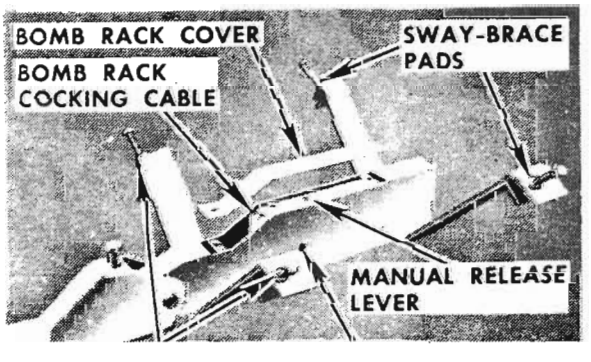
CABLE END LOOP



TARGET NOSE GUIDE



PARACHUTE CANISTER ATTACHED



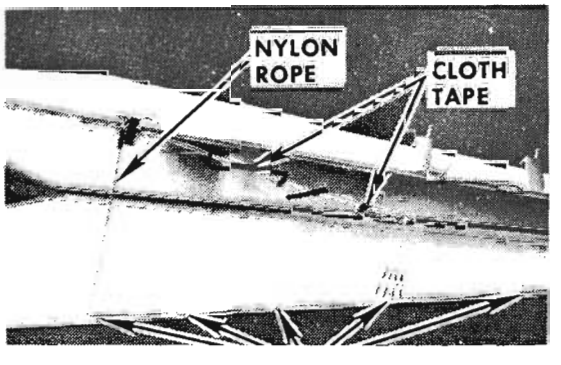


Figure 1-124. A/A37U-15 Tow Target System (Sheet 2 of 2)

SECTION II

NORMAL AIRCREW PROCEDURES

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CHECKLIST.

Refer to the Foreword for information on the abbreviated checklist. Refer to applicable Air Force regulations concerning the use of the checklist.

CODING.

This section contains exterior inspections for nonnuclear weapons that are mission essential which the pilot is not required to perform, since the correct installation and loading of suspension equipment and nonnuclear weapons is the responsibility of certified loading crew members. The exterior inspection steps preceded by an asterisk (*) are considered safety-of-flight items which should be checked by the pilot if time permits. All other exterior inspection steps also may be performed by the pilot, if desired. The designation [C] indicates a step or operation required only on F-100C aircraft.

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632.

M-39 Gun.

EXTERIOR INSPECTION.

1. Gun port plugs – REMOVED.
2. Ammunition – CHECK.

   Insure desired type of ammunition loaded. For training missions only, check ammunition color (if applicable).

BEFORE TAKEOFF.

1. Guns – Armed.

   Arm guns in accordance with local procedures.

BEFORE FIRING.

1. Mode selector switch – Sight & RADAR or MANUAL.
2. Sight – CAGED OR UNCAGED.

   Uncaged sight for air-to-air firings. For strafing, use sight electrical cage button or mechanically cage the sight.

3. Sight function selector lever – GUN.
4. Target speed switch – SET.

   Set target speed switch at TR, HI, or LO, depending upon speed ratio of attack to target for air-to-air firing.

5. Wingspan lever – SET.

   For air-to-air firing, adjust wingspan lever to wingspan of target airplanes. This allows manual ranging to be accomplished in a minimum amount of time should radar ranging fail.

6. Gun selector switch (F-100D Only) – SET.
7. Trigger safety switch – GUNS CAMERA.

WARNING

For safety reasons, this step should not be accomplished until just before firing.

FIRING.

1. Trigger – SQUEEZE.

CAUTION

Firing should be limited to a total of 3 seconds duration followed by a 1-minute cooling period to prevent damage to the M-39 guns.

- If it is necessary to nose the airplane down immediately after firing the guns at speeds above Mach 1, do not maintain the same heading at which the guns were fired. Instead, turn to one side or the other, and when possible, pull up slightly. This will prevent the airplane from intercepting its own projectiles.

BEFORE LANDING.

1. Trigger safety switch – CAMERA.
2. Sight – CAGED.

AFTER LANDING.

1. Guns – DEARM.

AIM-9B/E/J MISSILE

EXTERIOR INSPECTION.

1. NAVORD Form 2867 – CHECK.

   Insure that missile component serial numbers are correctly entered.

*2. Launcher rail safety pin – INSTALLED.

*3. Missiles – INSPECT.

   a. Dome – INSPECT.

   Check that dome is clean, secure, and free of chips or cracks. Reject domes that do not meet this criteria.

CAUTION

Care should be taken not to bump the guidance control fin tips.

b. Guidance fins – SECURE.

Inspect fins for security and proper mounting.

c. Influence fuze protection tape – REMOVE.

d. Missile body – CHECK.

Check condition of missile and security of attachment of guidance and control unit.

e. Stabilizing fins – SECURE.

Inspect fins for security and proper mounting.

f. Rollerons – CHECK & RECAGE.

Check for freedom of movement and recage.

g. Tracking flares – SECURE.

Check security and condition of tracking flares (training missiles only – if installed).

h. Deleted.

i. Umbilical cord – ATTACHED.

*4. Target rocket(s) (if applicable) – INSPECT.

a. Rocket shorting plug, correct type – INSTALLED.

Check that correct type rocket shorting plug is installed properly in launcher umbilical receptacle.

NOTE

Either a single-jumper or a three-jumper shorting plug may be used in a type IX pylon: however, only the three-jumper type permits operation of the status display light for the TDU.

- Only the three-jumper shorting plug shall be installed in a type IXA pylon when a TDU is carried: otherwise, the TDU cannot be fired and the status display light for the TDU will not come on. regardless of switch positions.

b. Target rocket pigtail plug – DISCONNECTED.

Check that rocket pigtail is taped to rocket fin assembly.

CAUTION

Check that a shorting clip is installed on rocket pigtail plug.

c. Tracking flares – SECURE.

BEFORE TAXI.

1. Missile master switch – RESET: then STANDBY.

After engine start, place missile master switch to RESET momentarily to reset firing circuit to missile station No. 1: then return switch to STANDBY.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Missile tone – CHECK.

Using station bypass switch, check each missile for presence of proper tone in headset. Place missile master switch to RESET momentarily to reset firing circuit to missile station No. 1: then return to STANDBY.

3. Target rocket pigtail plug (if applicable) – CONNECTED.

4. Check all safety pins and devices – REMOVED.

BEFORE FIRING.

1. Mode selector switch – SIGHT & RADAR.

2. Sight – CAGED.

3. Wingspan lever – 42 FEET.

4. Missile master switch – READY.

[C]5. Safety lock switch – ARM.

Note that "MISSILE 1" light comes on.

6. Missile tone – CHECK.

   If time and circumstances permit, boresight each missile and check that tone intensity and volume vary properly with changes in infrared radiation in seeker gyro's cone of view.

7. Volume control – AS DESIRED.

   Adjust volume control until tone of selected missile is barely audible.

8. Station bypass switch – DESIRED MISSILE OR ROCKET.

   Refer to section I for correct firing order.

9. Trigger safety switch – MISSILES CAMERA.

WARNING

For safety reasons, this step should not be accomplished until just before firing.

10. Status display lights – CHECK.

    Check status display lights to insure that desired missile or rocket has been selected.

FIRING.

1. Target rocket (if applicable) – LAUNCH.

   Squeeze trigger to fire target rocket. When trigger is released, the firing circuit automatically steps to the next launcher station. Use station bypass switch, if necessary, to select proper station for missile firing.

NOTE

A target rocket status display light indication will be obtained only when a three-jumper shorting plug is installed in the launcher.

2. Target – TRACK.

   Maneuver airplane so as to place target within sight reticle long enough to check missile tone, target range, and launch airplane acceleration.

3. Missile tone – CHECK.

   Check for contrast between background and target radiation to insure that target is within field of view of seeker gyro.

4. Launch parameters – CHECK.

   Insure that launch can be made within angle-off, G-range, and closure parameters.

5. Trigger – SQUEEZE.

   Hold trigger fully depressed until missile has left launcher rail.

NOTE

With type IX pylons, if the trigger is not held depressed until the missile has left the launcher rail, the possibility exists of activating the guidance and control unit without igniting the rocket motor. If this occurs, the missile cannot be subsequently fired. With type IXA pylons, this problem does not exist. When the trigger is released, the firing circuit automatically steps to the next launcher station. If there is no missile installed at the next station or if it is determined that an installed missile should not be fired because of a malfunction (e.g., no missile tone), use station bypass switch to step firing circuit to next missile.

BEFORE LANDING.

1. Trigger safety switch – CAMERA.
2. Missile master switch – STANDBY.
3. Sight – CAGED.

[C] 4. Safety lock switch – SAFE.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.
2. NAVORD Form 2867 – COMPLETE.

■ **LAU-3, -32, -59, and -68 Rocket Launchers.**

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – LOW BLOW.

Check that the valve inspection hole is not clear and that the pylon valve actuator arm has been positioned fully aft and up (type III pylon).

*3. Pylon sway braces – TIGHT.

4. Electrical connector plug – SECURE AND SAFETIED.

*5. Shorting button – INSTALLED.

WARNING

If the shorting button is not installed in the launcher receptacle, the rockets may be inadvertently fired.

6. Intervalometer – INSTALLED.

7. Rockets – LOCKED IN DETENTS.

8. Contact fingers – TOUCHING ROCKET IGNITER BUTTONS.

9. Launcher fairings – INSTALLED.

BEFORE TAKEOFF.

1. Forward shorting button – REMOVED.

2. Check all safety pins and devices – REMOVED.

3. Ejector cartridges – INSTALLED.

BEFORE FIRING.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Armament selector switch – ROCKET – FIRE.

6. Rocket selector switch – ALL or SINGLES.

WARNING

For safety reasons, this step should not be accomplished until just before firing.

FIRING.

1. Dive angle – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned dive angle.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Rocket selector switch – OFF.

2. Sight – CAGED.

3. Launchers – JETTISON (if desired).

a. Armament selector switch – ROCKET – JETT.

b. Bomb button – PRESS.

c. Armament selector switch – OFF.

or

d. Outboard external load auxiliary release button – PRESS.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-24, CBU-29, CBU-49, CBU-52, CBU-53, CBU-54, -58, CBU-71 Dispensers; M-65A1, M117, M117(R), MK-81, MK-82, MK-83, and MK-82 Snakeye I General Purpose Bombs; BLU-31/B Demolition Bomb, M129E1 Leaflet Bomb and MC-1 Gas Bomb.

EXTERIOR INSPECTION – M117 (R) BOMB.

*1. Pylon safety pin – INSTALLED.

2. Pylon Slide Valve – LOW BLOW (on all stations).

NOTE

Check that the valve inspection hole is not clear and the the pylon valve actuator arm has been positioned fully down (type I) or fully aft and up (type III).

*3. Pylon sway braces – TIGHT.

4. MAU-91 ( ) or MK-15 Mod 1 fin assembly – X – CONFIGURATION.

5. Check fin – PROPERLY INSTALLED.

NOTE

The nose-arming solenoid is on the left side of the pylon, and the tail solenoid is on the right side of the pylon (looking forward).

6. Arming wires – PROPERLLY INSTALLED.

*7. Fin assembly:

a. STEEL CLIP INSTALLED ON REAR OF LATCH SAFETY PIN.

b. ARMING LANYARD LOOP AT REAR OF MAU-91 ( ) CHANNEL ASSEMBLY SECURED TO FIN BY 0.020 SAFETY WIRE.

c. LATCH ASSEMBLY SPRING PROPER TENSION, NOT BENT.

*8. Fuzes – INSPECT (if visible).

If an FMU-54/B fuze is installed, check that selected arming delay setting is recorded on red tag.

WARNING

To assure safe escape in the event of premature airburst detonation, the FMU-54/B arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

9. M904-E2 nose fuze – PROPERLY INSTALLED (if applicable).

WARNING

Improper installation of arming wires/ lanyard could result in bomb being released in other tham programmed configuration.

- If the window indication in M904, M905 and M906 fuze body shows the fuze to be armed, the fuze is unsafe. Do not touch fuze. Notify explosive ordnance disposal (EOD) personnel immediately.

EXTERIOR INSPECTION – EXCEPT M117 (R) BOMBS.

NOTE

When the FMU-56( ) fuze is used with a CBU cluster dispenser, the following additional exterior inspection and arming checks must be made:

a. Shorting pin properly installed – CHECK.

b. Velocity sensor switch ports covered with tape – CHECK.

c. Arming timer switch position as briefed – CHECK.

d. Battery firing device installation – PERFORM THE FOLLOWING CHECKS.

(1) Check that the lanyard is routed through the third and fourth arming wire guides (frame nose to tail) before entering one end of the swivel and link assembly, and is routed through all remaining wire guides (on proper side of munition) before being attached to the binding post.

(2) Check that the other end of the swivel and link assembly is properly attached to the arming solenoid.

WARNING

Do not exert more than 15 pounds of force on the battery firing device lanyard. Forces greater than this may cock the initiator and release the firing pin, igniting the battery.

(3) Check that the slack in the installed lanyard is 1 to 1-1/2 inches.

(4) Check that the lanyard end is securely fastened to the binding post.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – LOW BLOW.

Check that the valve inspection hole is not clear and that the pylon valve actuator arm has been positioned fully down (type I) or fully aft and up (type III).

*3. Pylon sway braces – TIGHT.

4. Conical fin assembly – X-CONFIGURATION.

5. Arming wire(s) (and fin lanyard on high-drag bombs) – INSTALLED.

NOTE

The nose-arming solenoid is on the left side of the pylon, and the tail solenoid is on the right side of the pylon (looking forward).

6. Fuzes – INSPECT.

a. Nose and/or tail fuzes – PROPERLY INSTALLED.

Check that the arming wire is threaded through the vane-stop eyelets and is of proper length. Check for proper type of fuzes and correct time settings.

b. Nose fuze (CBU cluster dispenser with the FMU-26A/B or -26B/B fuze) – PROPERLY INSTALLED AND DOME SECURED.

Check that the arming wire is threaded through the eyelets and is of proper length. Check for proper type of fuze and correct time setting.

c. Tail fuze (FMU-54/B) – Check that the selected arming delay setting is recorded on the red tag.

WARNING

To assure safe escape in the event of premature airburst detonation, the FMU-54/B arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

- If the window indication in the M904, M905, M906, and FMU-30/B fuze body shows the fuze to be armed, the fuze is unsafe. Do not touch fuze. Call explosive ordnance disposal (EOD) personnel immediately.

- M904E2 nose fuzes, lot numbers LS-23-1, LS-24-1, LS-24-4, LS-23-9, LS-31-3, and LS-24-3A, shall not be used in the 2-second settings. The 4- through 18-second settings are within tolerance.

- Only the M906 tail fuze provides low-level bombing capabilities with general-purpose bombs.

BEFORE TAKEOFF.

1. Check all safety pins and devices – REMOVED.

2. Ejector cartridges – INSTALLED.

NOTE

When the FMU-56( ) fuze is used with a CBU cluster dispenser, the following safety devices must be removed from the FMU-56 in a designated arming area prior to launch:( )

a. Shorting pin.

b. Tape covering the velocity sensor ports.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.

   Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. Armament selector switch – BOMB–SINGLE OR BOMB–PAIRS.

WARNING

M117(R) bombs shall not be released in pairs from the inboard stations.

- For safety reasons, this step shall not be accomplished until just before release.
- Do not release bombs in SALVO mode, as bombs may collide and detonate, and damage airplane.

WARNING

If M117(R) or MK-82 (Snakeye I) bombs are being dropped, do not fly over or near burst area within 20 seconds after detonation as aircraft damage can result from flying debris. This 20-second spacing should also be observed during training missions where inert, sandfilled bombs are released. In this case, observance of the 20-second spacing between aircraft would prevent a bomb and trail aircraft collision in the event that a bomb went low drag and ricocheted into the air after impact.

6. Bomb arming switch – AS REQUIRED.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

CAUTION

If the bombs dropped were fuzed with an FMU-54/B fuze, move the bomb arming switch to SAFE, momentarily, to release the arming wires; otherwise, the wing or aileron could be damaged.

- If M117(R) bombs are dropped with the MAU-91 fin assembly configured for high-drag release, move the bomb-arming switch to SAFE, momentarily, to release the fin lanyard; otherwise, the airplane could be damaged.

7. Bomb arming switch – SAFE (momentarily).

BEFORE LANDING.

1. Bomb arming switch – SAFE.
2. Armament selector switch – OFF.
3. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

BLU-1, BLU-27 and BLU-32A/B Fire Bombs, and BLU-52 Chemical Bombs.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – AS REQUIRED.

Release of fire bombs from the outboard stations will be in the low blow release mode, except for the BLU-32A/B, BLU-1/B and BLU-27/B finned or unfinned will be released from the outboard stations in the low blow pylon release mode. Release of fire bombs, except the BLU-32/B, from the inboard stations using type 1B pylons may be in the low blow release mode. BLU-1A/B and BLU-27/B may be released from the inboard station in either low blow or high blow release mode when type 1B pylon is used. Release from other than type 1B pylon from the inboard stations will be in the high blow release mode. For either finned or unfinned BLU-32A/B fire bombs, the slide valve shall be in the high-blow position.

*3. Pylon sway braces – TIGHT.

*4. Arming lanyard loop – CONNECTED.

Insure that lanyard loop is connected to tail-arming solenoid (right side).

5. Initiator safety pin – INSTALLED.

WARNING

If the safe-arm pin protudes through the hole in the center of the FMU-7/B fuze head, or a hole is in the center of the FMU-7A/B or -7B/B fuze head, treat fuze as armed. Do not touch fuze. Notify explosive ordnance disposal personnel immediately.

*6. Nose and tail fairings – SECURE.

BEFORE TAKEOFF.

1. Check all safety pins and devices – REMOVED.
2. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

WARNING

The BLU-52( ) being unfuzed, cannot be jettisoned safe. This store must therefore be released over unfriendly or uninhabited territory and must not be returned to the base.

- Crew members on aircraft carrying the BLU-52 must carry gas masks for emergency evacuation in event of accidental release of the store while on the ground, as well as for delivery.

- The BLU-52 bomb must be expended (ejected or jettisoned) once it is airborne. If, for any reason, it cannot be delivered to the original, or alternate target, it must be released over designated hostile territory or over designated uninhabitable territory at least five miles from the nearest habitable site. Preferred sites will be selected by the local commander.

- Aircrew members on aircraft going to or near (within 5 miles and blow 5000 feet AGL) a target area already hit, or to be hit, by BLU-52 bombs, will carry the M-24 gas mask. The mask will be worn anytime the aircraft is within five miles of the target and below 5000 feet AGL.

- Aircraft carrying the BLU-52 should be the last to take off and the last to approach a target area. All other aircraft should evacuate to a distance of at least five miles while BLU-52 bombs are being delivered. Aircraft releasing the bombs should vacate the target area as soon as possible and remain at least five miles from the target or above 5000 feet AGL.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.

Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Armament selector switch – NAPALM REL & TANK JETT (appropriate station).

WARNING

For safety reasons, this step shall not be accomplished until just before release.

6. Bomb arming switch – AS REQUIRED.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

NOTE

After dispensing C/B munitions, or in the event of aircraft contamination from C/B munitions, the pilot will request the tower to prepare for isolated parking. At the same time, he will provide the unclassified designator of the agent.

1. Bomb arming switch – SAFE.

2. Armament selector switch – OFF.

3. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-1, CBU-2, CBU-3, CBU-9, CBU-12 and CBU-46 Dispensers.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that the valve inspection hole is clear and that the pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Nose plug – INSTALLED.

6. Tail cone protector – INSTALLED.

7. Tube selection – AS REQUIRED.

8. Electrical receptacle plate – POSITIONED FOR F-100.

9. Detent circuit plug – DISCONNECTED.

Insure that detent circuit plug is not connected until after a stray-voltage check has been performed.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Tail cone protector – REMOVED.

3. Detent circuit plug – CONNECTED.

4. Nose plug – REMOVED.

5. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode-selector switch – MANUAL.

2. Sight – UNCAGED.

   Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Chemical tank and CBU selector switch – OUTBD – LH, – RH, or – BOTH.

6. Armament selector switch – CHEM & SUU-7/A-RELEASE.

WARNING

For safety reasons, this step should not be accomplished until just before release.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.

2. Dispensers – JETTISON.

   Jettison dispensers, in accordance with local procedures and as follows:

   a. Armament selector switch – CHEM & SUU-7/A-OUTBD JETT.

   b. Bomb button – PRESS.

   c. Armament selector switch – OFF.

   or

   d. Outboard external load auxiliary release button – PRESS.

   or

   e. External load emergency jettison button – PRESS.

WARNING

If dispensers have been fired and are not jettisoned, for any reason, a hazardous condition will exist during flight over populated areas and during landing, as unexpended munitions may drop from the dispenser at any time. If dispenser cannot be jettisoned by any means and a landing with dispensers aboard is necessary avoid populated areas and proceed with step 3.

3. Chemical and SUU-7/A circuit breaker – OUT.

4. Chemical tank and CBU selector switch – UNUSED STATION.

5. Armament selector switch – OFF.

6. Mode selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-34 and CBU-42 Dispensers.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

   Check that the valve inspection hole is clear and that the pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Intervalometer setting – AS REQUIRED.

WARNING

Do not use 70 millisecond setting on CBU-34 or -42 above 460 KTAS dispensing airspeed.

6. Electrical receptacle plug – POSITIONED FOR F-100.

7. Detent circuit plug – DISCONNECTED.

   Insure that detent circuit plug is not connected until after a stray-voltage check has been performed.

8. Electrical cable (inside dispenser access panel – DISCONNECTED.

9. Safety pallet assembly – INSTALLED.

10. Intervalometer safety pin assembly – INSTALLED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Electrical cable (inside dispenser access panel) – CONNECTED.

3. Detent circuit plug – CONNECTED.

4. Check all safety pins and devices – REMOVED.

5. Safety pallet assembly – REMOVED.

6. Intervalometer safety pin assembly – REMOVED.

BEFORE RELEASE.

1. Mode-selector switch – MANUAL.

2. Sight – UNCAGED.

   Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Rocket function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Chemical tank and CBU selector switch – OUTBD – LH, –RH, or –BOTH.

6. Armament selector switch – CHEM & SUU-7/A-RELEASE.

WARNING

For safety reasons, this step should not be accomplished until just before release.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.

2. Dispensers – JETTISON.

   Jettison dispensers, in accordance with local procedures as follows:

   a. Armament selector switch – CHEM & SUU-7/A-OUTBD JETT.

   b. Bomb button – PRESS.

   c. Armament selector switch – OFF.

   or

   d. Outboard external load auxiliary release button – PRESS.

   or

   e. External load emergency jettison button – PRESS.

WARNING

If dispensers have been fired and are not jettisoned, for any reason, a hazardous condition will exist during flight over populated areas and during landing, as unexpended munitions may drop from the dispenser at any time. If dispenser cannot be jettisoned by any means, and a landing with dispensers aboard is necessary avoid populated areas and proceed with step 3.

3. Chemical and SUU-7/A circuit breaker – OUT.

4. Chemical tank and CBU selector switch – UNUSED STATION.

5. Armament selector switch – OFF.

6. Mode selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-7, CBU-28, CBU-30, and CBU-37 Dispensers.

EXTERIOR INSPECTION.

*1. Pylon Safety Pin – INSTALLED.

2. Pylon Slide Valve – HIGH BLOW.

   Check that the valve inspection hole is clear and that the pylon valve actuator arm has been pushed fully forward and UP.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Intervalometer Setting – AS REQUIRED.

6. Electrical receptacle plate – POSITIONED FOR F-100.

7. Detent circuit plug – DISCONNECTED.

   Insure that detent plug is not connected until after a stray-voltage check has been performed.

8. Electrical cable (inside dispenser access panel) – DISCONNECTED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Electrical cable (inside dispenser access panel) – CONNECTED.

3. Detent circuit plug – CONNECTED.

4. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

   Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Chemical tank and CBU selector switch – OUTBD – LH, – RH, or – BOTH.

6. Armament selector switch – CHEM & SUU-7/A – RELEASE.

WARNING

For safety reasons, this step should not be accomplished until just before release.

RELEASE PROCEDURES.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

NOTE

After dispensing C/B munitions, or in the event of aircraft contamination from C/B munitions, the pilot will request the tower to prepare for isolated parking. At the same time, he will provide the unclassified designator of the agent.

1. Sight – CAGED.

2. Dispensers – JETTISON.

   Jettison dispensers, in accordance with local procedures and as follows:

   a. Armament selector switch – CHEM & SUU-7/A – OUTBD JETT.

   b. Bomb button – PRESS.

   c. Armament selector switch – OFF.

   or

   d. Outboard external load auxiliary release button – PRESS.

   or

   e. External load emergency jettison button – PRESS.

WARNING

If dispensers have been fired and are not jettisoned, for any reason, a hazardous condition will exist during flight over populated areas and during landing, as unexpended munitions may drop from the dispenser at any time. If dispensers cannot be jettisoned by any means and a landing with dispensers aboard is necessary, avoid populated areas and proceed with step 3.

3. Chemical and SUU-7/A circuit breaker – OUT.

4. Chemical tank and CBU selector switch – UNUSED STATION.

5. Armament selector switch – OFF.

6. Mode selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

SUU-25 Series Flare/Marker Dispenser.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical connector plug – SECURE AND SAFETIED.

*5. Forward shorting device – INSTALLED AND SAFE.

6. Dispenser selector switch – SINGLE.

7. Flares or markers – INSTALLED.

NOTE

Fuze settings cannot be visually checked after installation of flares or markers in dispenser. Check with munitions personnel to insure that fuzes are properly set.

8. Dispenser tube safety pins – INSTALLED.

9. Detents – FULLY SEATED.

BEFORE TAKEOFF.

1. Forward shorting device – ARMED.

2. Check all safety pins and devices – REMOVED.

3. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Chemical tank and CBU selector switch – OUTBD – RH, – LH, or – BOTH.

3. Armament selector switch – CHEM & SUU-7/A – RELEASE.

WARNING

For safety reasons, this step should not be accomplished until just before release.

RELEASE.

1. Altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE

5. Target – TRACK.

Maneuver airplane so as to arrive at desired flare release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Armament selector switch – OFF.

2. Chemical tank and CBU selector switch – UNUSED STATION.

3. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

■ **SUU-20/A, /A(M), A/A, B/A Dispensers.**

EXTERIOR INSPECTION.

*1. Bomb/rocket safety clip – INSTALLED.

*2. Pylon safety pin – INSTALLED.

■ 3. Rocket** and bomb intervalometers – SAFE.

4. Bomb retaining locks – INSTALLED (BDU-33 bombs).

5. Dispenser – SECURE.

6. Pylon loading switch – AS REQUIRED.

When dispenser is installed at left intermediate station, position pylon intermediate switch at SPECIAL STORES (No. 8). When dispenser is installed at outboard station, position pylon outboard switch at 2.75 ROCKETS (19 ROUNDS) (No. 10).

7. Chemical and SUU-7A circuit breaker – OUT, if dispenser is installed at outboard station.

8. Armament selector switch – OFF.

9. Mode selector switch – OFF.

10. T-249 power switch or DCU-9/A option switch – OFF, if dispenser is installed at left intermediate station.

BEFORE TAKEOFF.

■ 1. Rocket intervalometer switch** – AS REQUIRED.

If dispenser is installed at outboard station, position switch to ARM; if dispenser is installed at left intermediate station, switch should remain at SAFE.

2. Bomb intervalometer switch – ARM.

3. Pylon safety pin, bomb retaining locks, bomb/rocket safety clip – REMOVED.

Arming crew will display the safety pin, retaining locks, and safety clip to pilot after setting intervalometer switches.

4. Ejector cartridges – INSTALLED.

BEFORE RELEASE – LEFT INTERMEDIATE STATION (BOMB DELIVERY).

NOTE

When carried at intermediate stations, bomb delivery only is authorized.

1. Mode selector switch – AS APPLICABLE FOR TYPE OF DELIVERY – MANUAL, LADD, etc.

2. Sight – UNCAGED.

Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Armament selector switch – SPECIAL STORES.

6. T-249 power switch or DCU-9/A option switch – OFF.

BEFORE RELEASE – OUTBOARD STATIONS (ROCKET DELIVERY).

NOTE

When the dispenser is installed at an outboard station, both bombs and rockets can be carried. The rockets shall be fired before bombs are dropped from the dispenser.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Armament selector switch – ROCKET-FIRE.

6. Rocket selector switch** – SINGLE. ■

** F-100 Airplanes Not Changed by T.O. 1F-100-1069

BEFORE RELEASE – OUTBOARD STATIONS (BOMB DELIVERY).

1. Outboard station pylon loading switch – CHEM & SUU-7/A.

CAUTION

Pylon load switch will be changed only on bombing range in a clear area where inadvertent release of stores would not constitute a safety hazard.

2. Mode selector switch – MANUAL.
3. Armament selector switch – CHEM & SUU-7/A RELEASE.
4. Chemical and SUU-7/A circuit breaker – IN.
5. CHEM & SUU-7/A – L.H. (R.H.) OUTBOARD.

RELEASE – LEFT INTERMEDIATE STATION (BOMB DELIVERY).

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

RELEASE – OUTBOARD STATIONS (ROCKET DELIVERY).

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.
7. Rocket intervalometer reset button** – PRESS AND HOLD FOR 3 SECONDS BETWEEN ROCKET PASSES. ■

NOTE

In the event of a hung rocket, do not attempt to drop bombs.

RELEASE – OUTBOARD STATIONS (BOMB DELIVERY).

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

**Airplanes Not Modified by T.O. 1F-100-1069.

BEFORE LANDING.

1. Armament selector switch – OFF.
2. Sight – CAGED.
3. T-249 power switch or DCU-9/A option switch – OFF or SAFE (dispenser at left intermediate station).

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

SUU-21/A Dispenser.

EXTERIOR INSPECTION.

*1. Pylon rack – COCKED AND LOCKED.

CAUTION

Check, through pylon inspection windows, that rack is fully cocked and locked (pylon decals match visual image).

*2. Pylon sway braces – TIGHT.

*3. Dispenser – INSPECT.

Check that dispenser is secure, free of damage, and doors open.

4. Electrical pullout plugs – CONNECTED AND SECURE.

*5. Safety stop guards – INSTALLED.

6. Bombs - CHECK.

Check for proper type of bombs at desired stations.

7. Rotary bomb selector switch – AS DESIRED.

CAUTION

Turn selector switch in a clockwise direction only, or damage to switch may result.

8. Relay box circuit breaker – IN.

9. Door mode selector switch – MANUAL or AUTOMATIC.

Select desired function for door operation. With the selector switch in the MANUAL mode, the doors remain open continuously until operated to the closed position by the DCU-9/A (T-1517) option selector switch. In the AUTOMATIC mode, the doors close automatically after each bomb release. The doors shall then be reopened by operating the DCU-9/A (t-1517) option selector switch.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.
2. Special store unlock handle – IN SAFETIED, and SEALED.

WARNING

Insure that handle is in to prevent inadvertent jettisoning of SUU-21/A dispenser.

3. Special store unlock light – OFF.

WARNING

If light comes on at any time, do not activate any armament switches.

4. Speed brake circuit breaker – OUT (except for air planes changed by T.O. 1F-100-822).
5. Dispenser doors – CLOSED.
   a. MANUAL mode (DCU-9/A or T-1517) – Close doors as follows:
      (1) Option selector switch – SAFE. Doors should close in approximately 10 seconds.
      (2) Warning light – FLASHES, GOES OFF. Warning light will flash while doors are closing, then go off.

   or

   b. AUTOMATIC mode (DCU-9/A or T-1517) – Close doors as follows:

(1) Option selector switch – SAFE.

(2) Control – SGA.

(3) Option selector switch – GROUND or AIR.

(4) Warning light – ON.

(5) Option selector switch – SAFE.

(6) Control arm – OS.

(7) Option selector switch – OFF, THEN SAFE.

(8) Control arm – SGA.

(9) Option selector switch – GROUND or AIR. Doors should close in approximately 10 seconds.

(10) Warning light – FLASHES, GOES OFF. Warning light will flash while doors are closing, then go off.

(11) Option selector switch – SAFE.

(12) Control arm – OS.

(13) Option selector switch – OFF.

6. Safety stop guards – REMOVED.

7. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight function selector lever – ROCKET.

3. Rocket depression angle selector lever – COMPUTED DEPRESSION.

4. Armament selector switch – SPECIAL STORE.

5. Sight – UNCAGED. Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflector glass.

6. Dispenser doors – OPEN.

WARNING

For safety reasons, this step should not be accomplished until airplane is over the range/target area as directed by local procedures.

a. Manual mode (DCU-9/A or T-1517).

(1) Option selector switch – GND or AIR. Doors should open in approximately 10 seconds.

(2) Warning light – FLASHES, COMES ON. Warning light flashes while doors are opening, then stays on.

or

b. AUTOMATIC mode (DCU-9/A or T-1517).

(1) Option selector switch – SAFE.

(2) Lock lever – SGA.

(3) Option selector switch – GND or AIR. Doors should open in approximately 10 seconds.

(4) Warning light – FLASHES, COMES ON. Warning light flashes while doors are opening, then stays on.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

7. Doors (MANUAL mode) – REMAIN OPEN.

   a. Warning light – STAYS ON.

WARNING

The weapon release system remains active with the dispenser set to the MANUAL mode. Insure that bomb button is not activated until succeeding maneuver release points are attained.

8. Doors (AUTOMATIC mode) – CLOSE AUTOMATICALLY.

   Doors require approximately 10 seconds to close.

   a. Warning light – FLASHES, GOES OUT.

RECYCLING – AUTOMATIC MODE ONLY.

To recycle doors in the AUTOMATIC mode for further deliveries, proceed as follows:

1. DCU-9/A or T-1517.

   a. Option selector switch – SAFE.

      Do not rotate option selector switch to SAFE while the warning light is flashing. After release, wait at least 15 seconds to insure that doors are closed before rotating option selector switch to SAFE.

   b. Control arm – OS.

   c. Option selector switch – OFF; then SAFE.

   d. Control arm – SGA.

   e. Option selector switch – GND or AIR.

      Doors should open in approximately 10 seconds.

   f. Warning light – FLASHES, COMES ON.

      Warning light flashes while doors are opening, then stays on.

BEFORE LANDING.

1. Armament selector switch – OFF.

2. Sight – CAGED.

3. Dispenser doors – CLOSED. Insure that doors are closed or dispenser is empty before departing range/target area. If doors cannot be closed and bombs are aboard, follow local procedures.

   a. AUTOMATIC mode (Non-automatic closing) (DCU-9/A or T-1517). To close doors after mission is complete if automatic closing did not operate:

      (1) Option Selector switch – RECYCLE option selector switch from AIR or GND to OFF to AIR or GND.

      (2) Warning light – FLASHES, GOES OUT.

      (3) Option selector switch – OFF.

   or

   b. MANUAL mode (DCU-9/A or T-1517). To close doors after mission is complete.

      (1) Option selector switch – SAFE.

      (2) Warning light – FLASHES, GOES OUT.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

AF/B37K-1 Bomb Container.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

   Check that the valve inspection hole is clear and the pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Manual release levers – SAFETIED.

5. Electrical connector plug – SECURE AND SAFETIED.

*6. Bombs – SECURE.

   Check for security and proper mounting. Slight horizontal and vertical movement of the bomb is permissible.

7. Racks – FULLY COCKED.

   Check, through four rack inspection holes, that solenoid pin engagement with release lever locking assembly is between 0.06 and 0.095 inch (50 percent engagement), and the tambler is engaged with lock link, four places.

*8. Container sway braces – TIGHT.

NOTE

Notify armament personnel if in wrong position.

BEFORE TAKEOFF.

1. Check all safety pins and devices – REMOVED.

2. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

   Move sight mechanical cage lever to UNCAGE. Note that reticle remains centered on reflected glass.

3. Sight function selector lever – ROCKET.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. Armament Selector Switch - BOMB - SINGLE. ■

WARNING

For safety reasons, this step should not be accomplished until just before release.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb Button – PRESS.

BEFORE LANDING.

1. Armament selector switch – OFF.

2. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

A/A37U-15 Tow-Target System – Airplanes Not Changed by T.O. 1F-100-1069.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

*4. Tow-target pod – SECURE, INSPECT.

Insure that all panels on pod are securely fastened and that pod Fiberglas body is not cracked, broken, or damaged in any manner.

5. Electrical connector plug – SECURE AND SAFETIED.

*6. Tow-reel housing – SECURE.

Check that locking shaft is bottomed in housing.

7. Reel spool – SAFETY-WIRED.

Insure that reel is safetied in two places to prevent freewheeling.

8. Reel spool cable – TIGHTLY WOUND.

NOTE

The cable is not crosswound or taped.

9. Nose guide pin – ALIGNED IN CHANNEL.

Insure that nose guide pin of dart target is inside nose guide channel and aligned with balance mark.

10. Tow-cable routing (parachute recovery system) – CHECK.

The cable should be routed from the bottom of the tow reel rearward through the cable-cutter mechanisms and out the rear of the pod.

a. Tow cable and parachute canister – CONNECTED.

b. Nylon rope and parachute canister – CONNECTED.

Insure that nylon leader rope is connected to aft eye of recovery parachute canister.

c. Recovery parachute canister – SECURE.

Insure that canister is securely taped (four turns) to aft overhand of reel pod.

11. Tow cable routing (no-chute system) – CHECK.

The cable should be routed from the bottom of the tow reel, rearward through the cable-cutter mechanism, out the rear of the pod, and connected to the nylon leader rope.

WARNING

Improper routing of the tow cable may prevent normal release of the dart target.

12. Nylon rope and bridle loop – CONNECTED.

Insure that nylon leader rope is safety-wired to dart target wind and connected to bridle loop.

*13. Launcher sway braces – TIGHT.

Insure that sway braces are holding dart firmly but are not warping wings.

14. Launcher manual release lever – LOCKED AND SAFETIED.

*15. Dart target – SECURE ON LAUNCHER.

Apply pressure to rear of dart to check for excessive lateral movement and overall security.

16. Dart wings – CHECK.

Insure that wings are not cracked, warped, or distorted.

17. Main gear extension – 10-7/16 INCHES (±¼ inch).

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Check all safety pins and devices – REMOVED.

BEFORE-LAUNCH (UNREELING).

1. Flaps – INTERMEDIATE or DOWN.

   If flaps were retracted after takeoff, lower flaps to intermediate or down position to improve low airspeed maneuvering qualities.

2. Airspeed – 190 KNOTS IAS.

   Maintain 190 knots IAS in unaccelerated (1 G) flight until cable has completely unreeled (approximately 2-1/2 minutes).

3. Altitude – AS DIRECTED.

4. Throttle – AS REQUIRED.

   Use throttle as necessary to maintain 190 knots IAS during cable reel-out. (Maintain level flight or climb at 190 knots IAS in Military Power.)

LAUNCH (UNREELING).

1. Armament selector switch – ROCKET – FIRE.

2. Rocket selector switch – SINGLES.

WARNING

   For safety reasons, this step should not be performed until just before launch (unreeling).

3. Bomb button – PRESS.

AFTER-LAUNCH (UNREELING).

1. Flaps – UP.

   Retract flaps after cable has reeled out.

2. Throttle – AS REQUIRED.

3. Climb airspeed – 300 KNOTS IAS (RECOMMENDED).

4. Dart stability – CHECK.

   Check that dart does not roll at climb airspeed.

BEFORE RELEASE.

NOTE

If target has been hit by gunfire, do not exceed 300 knots IAS en route to release area. If heavy damage has been inflicted, a lower airspeed may be required (200 knots IAS minimum).

1. Flaps – INTERMEDIATE or DOWN.

   Lower flaps to intermediate or down position to improve low airspeed maneuvering qualities.

2. Airspeed – 180 KNOTS IAS.

   Maintain 180 knots IAS in straight-and-level (1 G) flight.

NOTE

Speed should be stabilized at 180 knots IAS for a minimum of 1 minute before release, to insure that the dart has stabilized at the speed of the tow aircraft.

3. Altitude (high-altitude chute recovery system) – 2,000 FEET AGL.

4. Altitude (low-altitude chute/no-chute recovery system) – 1,000 FEET AGL.

5. Throttle – AS REQUIRED.

   Use throttle as necessary to maintain 180 knots IAS for release.

RELEASE.

1. Normal release.

   a. Rocket selector switch – SINGLES.

   b. Armament selector switch – ROCKET-FIRE.

   c. Rocket intervalometer reset button – PRESS.

      Hold button down for a minimum of 5 seconds.

WARNING

      For safety reasons, this step should not be performed until just before release.

   d. Bomb button – PRESS.

2. Auxiliary release (backup cutter).

   a. Armament selector switch – CHEM & SUU-7/A – RELEASE.

   b. Chemical tank and CBU selector switch – OUTBOARD – LH.

   c. Bomb button – PRESS.

AFTER RELEASE.

1. Flaps – UP.

2. Armament selector switch – OFF.

3. Rocket selector switch – OFF.

4. Chemical tank and CBU selector switch – UNUSED STATION.

AFTER LANDING.

1. Check all safety pins – INSTALLED.

A/A37U-15 TOW-TARGET SYSTEM – AIRPLANES CHANGED BY T.O. 1F-100-1069.

INTERIOR INSPECTION.

1. Left outboard pylon load switch – Check on SUU-20 position.
2. Armament selector switch – OFF.
3. Rocket selector switch – OFF.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

   Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

*4. Tow-target pod – SECURE, INSPECT.

   Insure that all panels on pod are securely fastened and that pod Fiberglas body is not cracked, broken, or damaged in any manner.

5. Electrical connector plug – SECURE AND SAFETIED.

*6. Tow-reel housing – SECURE.

   Check that locking shaft is bottomed in housing.

7. Reel spool – SAFETY-WIRED.

   Insure that reel is safetied in two places to prevent freewheeling.

8. Reel spool cable – TIGHTLY WOUND.

NOTE

The cable is crosswound and safety-wired.

9. Nose guide pin – ALIGNED IN CHANNEL.

   Insure that nose guide pin of dart target is inside nose guide channel and aligned with balance mark.

10. Tow-cable routing (parachute recovery system) – CHECK.

    The cable should be routed from the bottom of the tow reel rearward through the cable-cutter mechanisms and out the rear of the pod.

    a. Tow cable and parachute canister – CONNECTED.

    b. Nylon rope and parachute canister – CONNECTED.

       Insure that nylon leader rope is connected to aft eye of recovery parachute canister.

    c. Recovery parachute canister – SECURE.

       Insure that canister is securely taped (four turns) to aft overhand of reel pod.

11. Tow cable routing (no-chute system) – CHECK.

    The cable should be routed from the bottom of the tow reel, rearward through the cable-cutter mechanism, out the rear of the pod, and connected to the nylon leader rope.

WARNING

Improper routing of the tow cable may prevent normal release of the dart target.

12. Nylon rope and bridle loop – CONNECTED.

    Insure that nylon leader rope is safety-wired to dart target wind and connected to bridle loop.

*13. Launcher sway braces – TIGHT.

    Insure that sway braces are holding dart firmly but are not warping wings.

14. Launcher manual release lever – LOCKED AND SAFETIED.

*15. Dart target – SECURE ON LAUNCHER.

    Apply pressure to rear of dart to check for excessive lateral movement and overall security.

16. Dart wings – CHECK.

    Insure that wings are not cracked, warped, or distorted.

17. Main gear extension – 10-7/16 INCHES (±¼ inch).

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.
2. Check all safety pins and devices – REMOVED.

TAKEOFF.

1. Recompute – TAKEOFF SPEED.

   Compute takeoff speed from T.O. 1F-100C(I)-1-1 for the gross weight listed and add 10 knots then recompute takeoff distance.

2. Nose wheel steering – DISENGAGE AT 150 KIAS.
3. Normal rotation and takeoff at recomputed airspeed.

CAUTION

Over-rotation during takeoff will result in damage to the dart target and hazard to the aircraft.

- Do not launch the dart target if it is damaged on takeoff.

BEFORE-LAUNCH (UNREELING).

1. Flaps – INTERMEDIATE or DOWN.

   If flaps were retracted after takeoff, lower flaps to intermediate or down position to improve low airspeed maneuvering qualities.

2. Airspeed – 190 KNOTS IAS.

   Maintain 190 knots IAS in unaccelerated (1 G) flight until cable has completely unreeled (approximately 2-1/2 minutes).

3. Altitude – AS DIRECTED.
4. Throttle – AS REQUIRED.

   Use throttle as necessary to maintain 190 knots IAS during cable reel-out. (Maintain level flight or climb at 190 knots IAS in Military Power.)

LAUNCH (UNREELING)

1. Armament selector switch – ROCKET-FIRE.
2. Rocket selector switch – LEFT HAND (LH).
3. Bomb button – PRESS.
4. Rocket selector switch – OFF.

AFTER-LAUNCH (UNREELING).

1. Flaps – UP.

   Retract flaps after cable has reeled out.

2. Throttle – AS REQUIRED.
3. Climb airspeed – 300 KNOTS IAS (RECOMMENDED).
4. Dart stability – CHECK.

   Check that dart does not roll at climb airspeed.

BEFORE RELEASE.

NOTE

If target has been hit by gunfire, do not exceed 300 knots IAS en route to release area. If heavy damage has been inflicted, a lower airspeed may be required (200 knots IAS minimum).

1. Flaps – INTERMEDIATE or DOWN.

   Lower flaps to intermediate or down position to improve low airspeed maneuvering qualities.

2. Airspeed – 180 KNOTS IAS.

   Maintain 180 knots IAS in straight-and-level (1 G) flight.

NOTE

Speed should be stabilized at 180 knots IAS for a minimum of 1 minute before release, to insure that the dart has stabilized at the speed of the tow aircraft.

3. Altitude (high-altitude chute recovery system) – 2,000 FEET AGL.
4. Altitude (low-altitude chute/no chute recovery system) – 1,000 FEET AGL.
5. Throttle – AS REQUIRED.

   Use throttle as necessary to maintain 180 knots IAS for release.

RELEASE

1. Normal Release.

a. Armament selector switch – ROCKET-FIRE.

b. Rocket selector switch – LEFT HAND (LH).

c. Bomb button – PRESS.

2. Auxiliary release (backup cutter).

a. Armament selector switch – DISPENSER-RELEASE.

b. CHEM & SUU-7A selector switch – OUTBOARD-LH.

c. Bomb button – PRESS.

AFTER RELEASE.

1. Flaps – UP.
2. Armament selector switch – OFF.
3. Rocket selector switch – OFF.
4. CHEM & SUU-7/A selector switch – UNUSED STATION.

AFTER LANDING.

1. Check all safety pins – INSTALLED.

AIRPLANES CHANGED BY T.O. 1F-100D-632.

M-39 Gun.

EXTERIOR INSPECTION.

1. Gun ports plugs – REMOVED.

2. Ammunition – CHECK.

   Insure desired type of ammunition loaded. For training missions only, check ammunition color (if applicable).

BEFORE TAKEOFF.

1. Guns – ARMED.

   Arm guns in accordance with local procedures.

BEFORE FIRING.

1. Mode selector switch – SIGHT & RADAR or MANUAL.

2. Sight – CAGED or UNCAGED.

   Uncaged sight for air-to-air firing. For strafing, use sight electrical cage button or mechanically cage sight.

3. Sight function selector lever – GUN.

4. Target speed switch – SET.

   Set target speed switch at TR, HI, or LO, depending upon ratio of attack to target for air-to-air firing.

5. Wingspan lever – SET.

   For air-to-air firing, adjust wingspan lever to wingspan of target airplane. This allows manual ranging to be accomplished in a minimum amount of time should radar ranging fail.

6. Gun-missile switch – AS DESIRED.

   When missions dictates, move gun-missile switch to UPPER, ALL, or LOWER, as desired for the number of guns to be fired.

CAUTION

Do not fire upper guns when a store of any kind is carried on the inboard rack of either or both TERS to prevent damage to either airplane and/or stores from 20mm casings.

FIRING.

1. Trigger – SQUEEZE.

CAUTION

Firing should be limited to a total of 3 seconds duration followed by a 1-minute cooling period, to prevent damage to the M-39 guns.

- o If it is necessary to nose the airplane down immediately after firing the guns at speed above Mach 1, do not maintain the same heading at which the guns were fired. Instead, turn to one side or the other and, when possible, pull up slightly. This prevents the airplane from intercepting its own projectiles.

BEFORE LANDING.

1. Gun-missile switch – SAFE.

2. Sight – CAGED.

AFTER LANDING.

1. Guns –DEARM.

AIM-9B/E/J Missile.

EXTERIOR INSPECTION.

1. NAVORD Form 2867 – CHECK.

   Insure that missile component serial numbers are correctly entered.

*2. Launcher rail safety pin – INSTALLED.

*3. Missiles – INSPECT.

a. Dome – INSPECT.

Check that dome is clean, secure, and free of chips or cracks. Reject domes that do not meet this criteria.

CAUTION

Care shall be taken not to bump the guidance control fin tips.

b. Guidance fins – SECURE.

Inspect fins for security and proper mounting.

c. Influence fuze protection tape – REMOVE.

d. Missile body – CHECK.

Check condition of missile and security of attachment of guidance and control unit.

e. Stabilizing fins – SECURE.

Inspect fins for security and proper mounting.

f. Rollerons – CHECK & RECAGE.

Check for freedom of movement and recage.

g. Tracking flares – SECURE.

Check security and condition of tracking flares (training missiles only – if installed).

h. Umbilical cord – ATTACHED.

*4. Target rocket(s) (if applicable) – INSPECT.

a. Rocket shorting plug, correct type – INSTALLED.

Check that correct type rocket shorting plug is installed properly in launcher umbilical receptacle.

NOTE

Either a single-jumper or a three-jumper shorting plug may be used in a type IX pylon; however, only the three-jumper type permits operation of the status display light for the TDU.

- Only the three-jumper shorting plug shall be installed in a type IXA pylon when a TDU is carried; otherwise, the TDU cannot be fired and the status display light for the TDU will not come on, regardless of switch positions.

b. Target rocket pigtail plug – DISCONNECTED.

Check that rocket pigtail is taped to rocket fin assembly.

CAUTION

Check that a shorting clip is installed on rocket pigtail plug.

c. Tracking flares – SECURE.

BEFORE TAXI.

1. Missile master switch – RESET; then STANDBY.

After engine start, place missile master switch to RESET momentarily to reset firing circuit to missile station No. 1; then return switch to STANDBY.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Missile tone – CHECK.

Using station bypass switch, check each missile for presence of proper tone in headset. Place missile master switch to REST momentarily to reset firing circuit to missile station No. 1; then return to STANDBY.

3. Target rocket pigtail plug (if applicable) – CONNECTED.

4. Check all safety pins and devices – REMOVED.

BEFORE FIRING.

1. Mode selector switch – SIGHT & RADAR.

2. Sight – CAGED.

3. Wingspan lever – 42 FEET.
4. Missile master switch – READY.
5. Missile tone – CHECK.

   If time and circumstances permit, bore-sight each missile and check that tone intensity and volume vary properly with changes in infrared radiation in seeker gyro's cone of view.

6. Volume control – AS DESIRED.
7. Station bypass switch – DESIRED MISSILE or ROCKET.

   Refer to section 1 for correct firing order.

8. Gun-missile switches – MISSILES.
9. Station selector switches – AS REQUIRED.

   For the stations from which the missiles are to be fired, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

10. Status display lights – CHECK.

    Check status display lights to insure that desired missile or rocket has been selected.

FIRING.

1. Target rocket (if applicable) – LAUNCH.

   Squeeze trigger to fire target rocket. When trigger is released, the firing circuit automatically steps to the next launcher station. Use station bypass switch, if necessary, to select proper station for missile firing.

NOTE

A target rocket status display light indication will be obtained only when a three-jumper shorting plug is installed in the launcher.

2. Target – TRACK.

   Maneuver airplane so as to place target within sight reticle long enough to check missile tone, target range, and launch airplane acceleration.

3. Missile tone – CHECK.

   Check for contrast between background and target radiation to insure that target is within field of view of seeker gyro.

4. Launch parameters – CHECK.

   Insure that launch can be made within angle-off, G-range, and closure parameters.

5. Trigger – SQUEEZE.

   Hold trigger fully depressed until missile has left launcher rail.

NOTE

With type IX pylons, if the trigger is not held depressed until the missile has left the launcher rail, the possibility exists of activating the guidance and control unit without igniting the rocket motor. If this occurs, the missile cannot be subsequently fired. With type IXA pylons, this problem does not exist. When the trigger is released, the firing circuit automatically steps to the next launcher station. If there is no missile installed at the next station or if it is determined that an installed missile should not be fired because of a malfunction (e.g., no missile tone), use station bypass switch to step firing circuit to the next missile.

BEFORE LANDING.

1. Gun-missile switch – SAFE.
2. Missile master switch – STANDBY.
3. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.
2. NAVORD Form 2867 – COMPLETE.

LAU-3, -32, -59, and -68 Rocket Launchers – Using AWRS.

NOTE

If the AWRS programmer is not installed, this procedure cannot be used. Use the procedure for these weapons entitled "NOT USING AWRS," and insure that the programmer wiring harnesses are plugged into the bypass adapter.

EXTERIOR INSPECTION.

1. Pylon safety pin – INSTALLED.
2. Pylon slide valve – LOW BLOW.

   Check that valve inspection hole is not clear and that pylon valve actuator arm has been positioned fully aft and up (type III pylon).

*3. Pylon sway braces – TIGHT.

4. Electrical connector plug – SECURE AND SAFETIED.

*5. Shorting button – INSTALLED.

WARNING

If the shorting button is not installed in the launcher receptacle, the rockets may be inadvertently fired.

6. Intervalometer – INSTALLED.
7. ROCKETS – LOCKED IN DETENTS.
8. Contact fingers – TOUCHING ROCKET IGNITER BUTTONS.
9. Launcher fairings – INSTALLED.

BEFORE TAKEOFF.

1. Forward shorting button – REMOVED.
2. Check all safety pins and devices – REMOVED.
3. Ejector cartridges – INSTALLED.

BEFORE FIRING.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.

   Note that reticle remains centered on reflector glass after sight is uncaged.

3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – 2.

   Check AWRS power-on light on after switch is set.

6. AWRS release interval switch – AS REQUIRED.
7. AWRS multiplier switch – XI.
8. AWRS mode select switch – AS REQUIRED. ■
9. Armament selector switch – RKTS.
10. Station selector switches – AS REQUIRED.

    For the stations from which the rockets are to be fired, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

FIRING.

1. Dive angle – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired airspeed at firing point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired firing point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.
2. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out after switch is moved to OFF.

3. Rocket launchers – JETTISON (if desired).

CAUTION

When rocket launchers containing rockets are jettisoned in the dispenser jettison mode, the aircraft must be headed away from friendly areas. In the dispenser jettison mode, the normal rocket fire signal is received at the launcher simultaneously with the jettison signal thus launching one or more rockets.

a. Armament selector switch – DISP JETT.

CAUTION

When "dispenser jettison" is selected to release a rocket launcher, a rocket fire signal is also received at the launcher. Before attempting to jettison rocket launchers, all rockets must be released on target or fired in a safe area to avoid accidental firing in the area of friendly forces.

b. Station selector switches – AS REQUIRED.

   For the stations from which the rocket launchers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

c. Bomb button – PRESS.

d. Armament selector switch – OFF.

   or

e. Applicable external load auxiliary release button – PRESS.

f. External load emergency jettison button – PRESS.

4. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

LAU-3, -32, -59, and -68 Rocket Launchers – Not Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – LOW BLOW.

   Check that valve inspection hole is not clear and that pylon valve actuator arm has been positioned fully aft and up (type III pylon).

*3. Pylon sway braces – TIGHT.

4. Electrical connector plug – SECURE AND SAFETIED.

*5. Shorting button – INSTALLED.

WARNING

If the shorting button is not installed in the launcher receptacle, the rockets may be inadvertently fired.

6. Intervalometer – INSTALLED.
7. Rockets – LOCKED IN DETENTS.
8. Contact fingers – TOUCHING ROCKET IGNITER BUTTONS.
9. Launcher fairings – INSTALLED.

BEFORE TAKEOFF.

1. Forward shorting button – REMOVED.
2. Check all safety pins and devices – REMOVED.
3. Ejector cartridges – INSTALLED.

BEFORE FIRING.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.

   Note that reticle remains centered on reflector glass after sight is uncaged.

3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – OFF.
6. Armament selector switch – RKTS.
7. Station selector switches – AS REQUIRED.

   For the stations from which the rockets are to be fired, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

FIRING.

1. Dive angle – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired airspeed at firing point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired firing point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.
2. Rocket launchers – JETTISON (if desired).

CAUTION

When rocket launchers containing rockets are jettisoned in the dispenser jettison mode, the aircraft must be headed away from friendly areas. In the dispenser jettison mode, the normal rocket fire signal is received at the launcher simultaneously with the jettison signal thus launching one or more rockets.

a. Armament selector switch – DISP JETT.

CAUTION

When 'dispenser jettison' is selected to release a rocket launcher, a rocket fire signal is also received at the launcher. Before attempting to jettison rocket launchers, all rockets must be released on target or fired in a safe area to avoid accidental firing in the area of friendly forces.

b. Station selector switches – AS REQUIRED.

   For the stations from which the rocket launchers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

c. Bomb button – PRESS.
d. Armament selector switch – OFF.

   or

e. Applicable external load auxiliary release button – PRESS.

   or

f. External load emergency jettison button – PRESS.

3. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-24, CBU-29, CBU-49, CBU-52, CBU-53, CBU-54, -58, CBU-71 Dispensers; M-65A1, M117, M117(R), MK-81, MK-82, MK-83 and MK-82 Snakeye I General Purpose Bombs; BLU-31/B Demolition Bomb, M129E1 Leaflet Bomb and MC-1 Gas Bomb – Using AWRS.

NOTE

If the AWRS programmer is not installed, this procedure cannot be used. Use the procedure for these weapons entitled 'NOT USING AWRS', and insure that the programmer wiring harnesses are plugged into the bypass adapter.

EXTERIOR INSPECTION – M117(R) Bomb.

*1. Pylon safety pin – INSTALLED.

2. Pylon Slide Valve – LOW BLOW (on all stations).

NOTE

Check that valve inspection hole is not clear and that pylon valve actuator arm has been positioned fully down (type I) or fully aft and up (type III).

(For TER loaded pylons--

a. Pylon Slide Valve – HIGH BLOW.

b. TER electrical lead connected – CHECK.

c. TER ejector rack safety pins – CHECK INSTALLED.

d. TER electrical shorting pin – CHECK INSTALLED.)

*3. Pylon/ejector rack sway braces – TIGHT.

4. MAU-91( ) or MK-15 Mod I fin assembly – X-CONFIGURATION.

5. Check fin – PROPERLY INSTALLED.

NOTE

The nose-arming solenoid is on the left side of the pylon, and the tail solenoid is on the right side of the pylon (looking forward).

6. Arming wires – PROPERLY INSTALLED.

*7. Fin assembly:

a. STEEL CLIP INSTALLED ON REAR OF LATCH SAFETY PIN.

b. ARMING LANYARD LOOP AT REAR OF MAU-91( ) CHANNEL ASSEMBLY SECURED TO FIN BY 0.020 SAFETY WIRE.

c. LATCH ASSEMBLY SPRING PROPER TENSION, NOT BENT.

*8. Fuzes – INSPECT (IF VISIBLE).

If an FMU-54/B tail fuze is installed, check that selected arming delay setting is recorded on red tag.

WARNING

To assure safe escape in the event of premature airburst detonation, arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

9. M904-E2 nose fuze – PROPERLY INSTALLED (IF APPLICABLE).

WARNING

Improper installation of arming wires/ lanyard could result in bomb being released in other than programmed configuration.

- If the window indication in M904, M905 and M906 fuze body shows the fuze to be armed, the fuze is unsafe. Do not touch fuze. Notify explosive ordnance disposal (EOD) personnel immediately.

EXTERIOR INSPECTION – EXCEPT M117(R) BOMBS.

NOTE

When the FMU-56( ) fuze is used with a CBU cluster dispenser, the following additional exterior inspection and arming checks must be made:

a. Shorting pin properly installed – CHECK.

b. Velocity sensor switch ports covered with tape – CHECK.

c. Arming timer switch position as briefed – CHECK.

d. Battery firing device installation – PERFORM THE FOLLOWING CHECKS:

(1) Check that the lanyard is routed through the third and fourth arming wire guides (frame nose to tail) before entering one end of the swivel and link assembly, and is routed through all remaining wire guides (on proper side of munition) before being attached to the binding post.

(2) Check that the other end of the swivel and link assembly is properly attached to the arming solenoid.

WARNING

Do not exert more than 15 pounds of force on the battery firing device lanyard. Forces greater than this may cock the initiator and release the firing pin, igniting the battery.

(3) Check that the slack in the installed lanyard is 1 to 1-½ inches.

(4) Check that the lanyard end is securely fastened to the binding post.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – LOW BLOW.

Check that the valve inspection hole is not clear and that the pylon valve actuator arm has been positioned fully down (type I) or fully aft and up (type III).

(For TER loaded pylons--

a. Pylon slide valve – HIGH BLOW.

b. TER electrical lead connected – CHECK.

c. TER ejector rack safety pins – CHECK INSTALLED.

d. TER electrical shorting pin – CHECK INSTALLED.)

3. Pylon/ejector rack sway braces – TIGHT.

4. Conical fin assembly – X-CONFIGURATION.

5. Arming wire(s) (and fin lanyard on high-drag bombs) – INSTALLED.

NOTE

The nose-arming solenoid is on the left side of the pylon, and the tail solenoid is on the right side of the pylon (looking forward).

*6. Fuzes – INSPECT.

a. Nose and/or tail fuzes – PROPERLY INSTALLED.

Check that arming wire is threaded through vane-stop eyelets and is of proper length. Check for proper type of fuzes and correct time settings.

b. Nose fuze (CBU cluster dispenser with the FMU-26A/B or -26B/B fuze) – PROPERLY INSTALLED AND DOME SECURED.

Check that arming wire is threaded through eyelets and is of proper length. Check for proper type of fuze and correct time setting.

c. Tail fuze (FMU-54/B) – Check that selected arming delay setting is recorded on red tag.

WARNING

To assure safe escape in the event of premature airburst detonation, the FMU-54/B arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

- If the window indication in the M904, M905, M906 and FMU-30/B fuze body shows the fuze to be armed, the fuze is unsafe. Do not touch fuze. Call explosive ordnance disposal (EOD) personnel immediately.
- M904E2 nose fuzes, lot numbers LS-23-1, LS-24-1, LS-24-4, LS-23-9, LS-31-3, and LS-24-3A shall not be used in the 2-second settings. The 4- through 8-second settings are within tolerance.
- Only the M906 tail fuze provides low-level bombing capabilities with general-purpose bombs.

BEFORE TAKEOFF.

NOTE

When the FMU-56( ) fuze is used with a CBU cluster dispenser, the following safety devices must be removed from the FMU-56( ) in a designated arming area prior to launch:

a. Shorting pin.

b. Tape covering the velocity sensor ports.

1. Check all safety pins and devices – REMOVED.
2. Ejector cartridges – INSTALLED.

BEFORE RELEASE

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.

   Note that sight reticle remains centered on reflector glass after sight is uncaged.

3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – AS REQUIRED.

   Check AWRS power-on light on after switch is set.

6. AWRS release interval switch – AS REQUIRED.

NOTE

When bombs installed on TER's are to be released, the release interval switch shall be set at a minimum of 60 milliseconds, to allow sufficient time for cocking and releasing each TER rack.

WARNING

M117(R) bombs shall not be released in pairs from the inboard stations. Do not release bombs in SALVO mode, as bombs may collide and detonate, and damage airplane.

7. AWRS multiplier switch – AS REQUIRED.
8. AWRS mode selector switch – AS REQUIRED.
9. Armament selector switch – BOMBS.
10. Station selector switches – AS REQUIRED.

    For the stations from which the bombs are to be released, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

11. Bomb arming switch – AS REQUIRED.

RELEASE

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS (and hold until completion of release if using RIPPLE mode.)

WARNING

If M117(R) or MK-82 (Snakeye I) bombs are being dropped, do not fly over or near burst area within 20 seconds after detonation as aircraft damage can result from flying debris. This 20-second spacing should also be observed during training missions where inert, sandfilled bombs are released. In this case, observance of the 20-second spacing between aircraft would prevent a bomb and trial aircraft collision in the event that a bomb went low drag and ricocheted into the air.

7. Bomb arming switch – SAFE (momentarily) if retarded bombs dropped.

CAUTION

If the bombs dropped were retarded or fuzed with an FMU-54/B fuze, move the bomb arming switch to SAFE, momentarily, to release the arming wires; otherwise, the wing or aileron could be damaged.

- If M117(R) bombs are dropped with the MAU-91 fin assembly configured for high-drag release, move the bomb arming switch to SAFE, momentarily, to release the fin lanyard; otherwise, the airplane could be damaged.

BEFORE LANDING.

1. Bomb arming switch – SAFE.
2. Armament selector switch – OFF.
3. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out after switch is moved to OFF.

4. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-24, CBU-29, CBU-49, CBU-52, CBU-53, -54, -58, CBU-71 Dispensers; M65A1, M117, M117(R), MK-81, MK-82, MK-83 and MK-82 Snakeye I General Purpose Bombs; BLU-31/B Demolition Bomb, M129E1 Leaflet Bomb and MC-1 Gas Bomb – Not Using AWRS.

EXTERIOR INSPECTION – M117(R) BOMBS.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – LOW BLOW (on all stations).

NOTE

Check that valve inspection hole is not clear and that pylon valve actuator arm has been positioned fully down (type I) or fully aft and up (type III).

(For TER loaded pylons--

a. Pylon Slide Valve – HIGH BLOW.

b. TER electrical lead connected – CHECK.

c. TER ejector rack safety pins – CHECK INSTALLED.

d. TER electrical shorting pin – CHECK INSTALLED.)

*3. Pylon/ejector rack sway braces – TIGHT.

4. MAU-91( ) or MK-15 Mod 1 fin assembly – X-CONFIGURATION.

4. Check fin – PROPERLY INSTALLED.

NOTE

The nose-arming solenoid is on the left side of the pylon, and the tail solenoid is on the right side of the pylon (looking forward).

6. Arming wires – PROPERLY INSTALLED.

*7. Fin assembly:

a. STEEL CLIP INSTALLED ON REAR OF LATCH SAFETY PIN.

b. ARMING LANYARD LOOP AT REAR OF MAU-91( ) CHANNEL ASSEMBLY SECURED TO FIN BY 0.020 SAFETY WIRE.

c. LATCH ASSEMBLY SPRING PROPER TENSION, NOT BENT.

*8. Fuzes – INSPECT (if visible).

If an FMU-54/B tail fuze is installed, check that selected arming delay setting is recorded on red tag.

WARNING

To assure safe escape in the event of premature airburst detonation, the FMU-54/B arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

9. M904-E2 nose fuze – PROPERLY INSTALLED (if applicable).

WARNING

Improper installation of arming wires/lanyard could result in bomb being released in other than programmed configuration.

- If the window indication in M904, M905, and M906 fuze body shows the fuze to be armed, the fuze is unsafe. Do not touch fuze. Notify explosive ordnance disposal (EOD) personnel immediately.

EXTERIOR INSPECTION – EXCEPT M117(R) BOMBS.

NOTE

When the FMU-56( ) fuze is used with a CBU cluster dispenser, the following additional exterior inspection and arming checks must be made:

a. Shorting pin installed – CHECK.

b. Velocity sensor switch ports covered with tape – CHECK.

c. Arming timer switch position as briefed – CHECK.

d. Battery firing device installation – PERFORM THE FOLLOWING CHECKS:

(1) Check that the lanyard is routed through the third and fourth arming wire guides (frame nose to tail) before entering one end of the swivel and link assembly and is routed through all remaining wire guides (on proper side of munition) before attached to the bind-in post.

(2) Check that the other end of the swivel and link assembly is properly attached to the arming solenoid.

WARNING

Do not exert more than 15 pounds of force on the battery firing device lanyard. Forces greater than this may cock the initiator and release the firing pin, igniting the battery.

(3) Check that the slack in the installed lanyard is 1 to 1-1/2 inches.

(4) Check that the lanyard end is securely fastened to the binding post.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – LOW BLOW.

Check that the valve inspection hole is not clear and that the pylon valve actuator arm has been positioned fully down (type I) or fully aft and up (type III).

(For TER loaded pylons--

a. Pylon slide valve – HIGH BLOW.

b. TER electrical lead connected – CHECK.

c. TER ejector rack safety pins – CHECK INSTALLED.

d. TER electrical shorting pin – CHECK INSTALLED.)

*3. Pylon/ejector rack sway braces – TIGHT.

4. Conical fin assembly – X-CONFIGURATION.

5. Arming wire(s) (and fin lanyard on high-drag bombs) – INSTALLED.

NOTE

The nose-arming solenoid is on the left side of the pylon, and the tail solenoid is on the right side of the pylon (looking forward).

*6. Fuzes – INSPECT.

a. Nose and/or tail fuzes – PROPERLY INSTALLED.

Check that arming wire is threaded through vane-stop eyelets and is of proper length. Check for proper type of fuzes and correct time settings.

b. Nose fuze (CBU cluster dispenser with the FMU-26A/B or -26B/B fuze) – PROPERLY INSTALLED AND DOME SECURED.

Check that arming wire is threaded through eyelets and is of proper length. Check for proper type of fuze and correct time setting.

WARNING

To assure safe escape in the event of premature airburst detonation, the FMU-54/B arming delay time setting should be a minimum of 2.5 seconds. Select minimum release conditions which will provide a bomb time of flight in excess of 2.8 seconds to assure adequate time for the FMU-54/B fuze to arm prior to impact.

- If the window indication in the M904, M905, M906 and FMU-30/B fuze body shows the fuze to be armed, the fuze is unsafe. Do not touch fuze. Call explosive ordnance disposal (EOD) personnel immediately.
- M904E2 nose fuzes, lot numbers LS-23-1, LS-24-1, LS-24-4, LS-23-9, LS-31-3 and LS-24-3A shall not be used in the 2-second settings. The 4- through 18-second settings are within tolerance.
- Only the M906 tail fuze provides low-level bombing capabilities with general-purpose bombs.

BEFORE TAKEOFF.

NOTE

When the FMU-56( ) fuze is used with a CBU cluster dispenser, the following safety devices must be removed from the FMU-56( ) in a designated arming area prior to launch:

a. Short pin – REMOVE.

b. Tape covering the velocity sensor ports – REMOVE.

1. Check all safety pins and devices – REMOVED.
2. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.
3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out.
6. Armament selector switch – BOMBS.
7. Station selector switches – AS REQUIRED.

   For the stations from which the bombs are to be released, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.
8. Bomb arming switch – AS REQUIRED.

WARNING

M117(R) bombs shall not be released in pairs from the inboard stations.

- Bombs must not be released simultaneously from adjacent stations; otherwise, the bombs may collide and detonate, and damage airplane.
- If M117(R) or MK-82 (Snakeye I) bombs are being dropped, do not fly over or near burst area within 20 seconds after detonation as aircraft damage can result from flying debris. This 20-second spacing should also be observed during training where inert, sandfilled bombs are released. In this case, observance of the 20-second spacing between aircraft would prevent a bomber and trail aircraft collision in the event that a bomb went low drag and ricocheted into the air after impact.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.
2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.
3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

CAUTION

If the bombs dropped were fuzed with an FMU-54/B fuze, move the bomb arming switch to SAFE, momentarily, to release the arming wires; otherwise, the wing or aileron could be damaged.

- If M117(R) bombs are dropped with the MAU-91 fin assembly configured for high-drag release, move the bomb arming switch to SAFE, momentarily, to release the fin lanyard; otherwise, the airplane could be damaged.

NOTE

If release of bombs from TER's has been selected, only one bomb will release from a TER for each depression of the bomb button.

■ 7. Bomb arming switch – SAFE (momentarily).

BEFORE LANDING.

1. Bomb arming switch – SAFE.
2. Armament selector switch – OFF.
3. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

BLU-1, BLU-27 and BLU-32A/B Fire Bombs, and BLU-52 Chemical Bombs – Using AWRS.

NOTE

If the AWRS programmer is not installed, this procedure cannot be used. Use the procedure for these weapons entitled 'NOT USING AWRS', and insure that the programmer wiring harnesses are plugged into the bypass adapter.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – AS REQUIRED.

Release of fire bombs except the BLU-32A/B, from the outboard stations will be in the low blow release mode. BLU-1/B and BLU-27/B finned or unfinned will be released from the outboard stations in the low blow pylon release mode. Release of fire bombs, except the BLU-32A/B, from the inboard stations using type 1B pylons may be in the low blow release mode. BLU-1/B and BLU-27/B finned or unfinned may be released from the inboard station in either low or high blow release mode when type 1B pylon is used.

Release from other than type 1B pylon from the inboard stations will be in the high blow release mode. For either finned or unfinned BLU-32A/B fire bombs, the slide valve shall be in the high blow position.

(For TER loaded pylons--

a. Pylon slide valve – HIGH BLOW.

b. TER electrical lead connected – CHECK.

c. TER ejector rack safety pins – CHECK INSTALLED.

*3. Pylon/ejector rack sway braces – TIGHT.

*4. Arming lanyard loop – CONNECTED.

Insure that lanyard loop is connected to tail-arming solenoid (right side).

5. Initiator safety pin – INSTALLED.

WARNING

If the safe-arm pin protrudes through the hole in the center of the FMU-7/B fuze head, or a hose is in the center of the FMU-7A/B or -7B/B fuze head, treat fuze as armed. Do not touch fuze. Notify explosive ordnance disposal (EOD) personnel immediately.

*6. Nose and tail fairings – SECURE.

BEFORE TAKEOFF.

1. Check all safety pins and devices – REMOVED.
2. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

WARNING

The BLU-52( ) being unfuzed, cannot be jettisoned safe. This store must therefore be released over unfriendly or uninhabited territory and must not be returned to base.

- Crew members on aircraft carrying the BLU-52 must carry gas masks for emergency evacuation in event of accidental release of the store while on the ground, as well as for delivery.
- The BLU-52 bomb must be expended (ejected or jettisoned) once it is airborne. If, for any reason, it cannot be delivered to the original, or alternate target, it must be released over designated hostile territory or over designated uninhabitable territory at least five miles from the nearest habitable site. Preferred sites will be selected by the local commander.
- Aircrew members on aircraft going to or near (within 5 miles and below 5000 feet AGL) a target area already hit, or to be hit, by BLU-52 bombs, will carry the M-24 gas mask. The mask will be worn anytime the aircraft is within five miles of the target and below 5000 feet AGL.
- Aircraft carrying the BLU-52 should be the last to take off and the last to approach a target area. All other aircraft should evacuate to a distance of at least five miles while BLU-52 bombs are being delivered. Aircraft releasing the bombs should vacate the target area as soon as possible and remain at least five miles from the target or above 5000 feet AGL.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.
3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – AS REQUIRED.

   Check AWRS power-on light on after switch is set.
6. AWRS release interval switch – AS REQUIRED.

NOTE

When fire bombs installed on TER's are to be released, the release interval switch should be set at a minimum of 60 milliseconds, to allow sufficient time for cocking and releasing each TER rack.

7. AWRS multiplier switch – AS REQUIRED.
8. AWRS mode select switch – AS REQUIRED.
9. Armament selector switch – NAPALM.
10. Station selector switches – AS REQUIRED.

    For the stations from which the fire bombs are to be released, move the station selector to NORM when mission dictates. Check all other station selector switches at SAFE.
11. Bomb arming switch – AS REQUIRED.

RELEASE.

1. Dive angle/altitude – AS REQUIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.
2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.
3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.
6. Bomb button – PRESS.

BEFORE LANDING.

NOTE

After dispensing C/B munitions, or in the event of aircraft contamination for C/B munitions, the pilot will request the tower to prepare for isolated parking. At the same time, he will provide the unclassified designator of the agent.

1. Bomb arming switch – SAFE.
2. Armament selector switch – OFF.
3. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out after switch is moved to OFF.

4. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

BLU-1, BLU-27 and BLU-32A/B Fire Bombs, and BLU-52 Chemical Bombs – Not Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – AS REQUIRED.

   Release of the bombs, except the BLU-32A/B from the outboard stations will be in the low blow release mode, BLU-1/B and BLU-27/B finned and unfinned will be released from the outboard stations in the low blow pylon release mode. Release of fire bombs, except the BLU-32A/B, from the inboard stations using type 1B pylons may be in the low blow release mode. BLU-1/B and BLU-27/B finned and unfinned may be released from the inboard stations in either low blow or high blow release mode when type 1B pylon is used.

   Release from other than type 1B pylon from the inboard stations will be in the high blow release mode. For unfinned BLU-32A/B fire bombs, the slide valve shall be in the high blow position.

(For TER loaded pylons--

   a. Pylon slide valve – HIGH BLOW.

   b. TER electrical lead connected – CHECK.

   c. TER ejector rack safety pins – CHECK INSTALLED.)

*3. Pylon/ejector rack sway braces – TIGHT.

*4. Arming lanyard loop – CONNECTED.

   Insure that lanyard loop is connected to tail-arming solenoid (right side).

5. Initiator safety pin – INSTALLED.

*6. Nose and tail fairings – SECURE.

WARNING

If a pin protrudes through the hole in the center of the FMU-7/B fuze head, or a hole is in the center of the FMU-7 A/B or -7B/B fuze head, treat fuze as armed. Do not touch fuze. Notify explosive ordnance (EOD) disposal personnel immediately.

BEFORE TAKEOFF.

1. Check all safety pins and devices – REMOVED.
2. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

WARNING

The BLU-52( ) being unfuzed, cannot be jettisoned safe. This store must therefore be released over unfriendly or uninhabited territory and must not be returned to base.

- Crew members on aircraft carrying the BLU-52 must carry gas masks for emergency evacuation in event of accidental release of the store while on the ground, as well as for delivery.
- The BLU-52 bomb must be expended (ejected or jettisoned) once it is airborne.

If, for any reason, it cannot be delivered to the original, or alternate target, it must be released over designated hostile territory or over designated uninhabitable territory at least five miles from the nearest habitable site. Preferred sites will be selected by the local commander.

- Aircrew members on aircraft going to or near (within 5 miles and below 5000 feet AGL) a target area already hit, or to be hit, by BLU-52 bombs, will carry the M-24 gas mask. The mask will be worn anytime the aircraft is within five miles of the target and below 5000 feet AGL.

- Aircraft carrying the BLU-52 should be the last to take off and the last to approach a target area. All other aircraft should evacuate to a distance of at least five miles while BLU-52 bombs are being delivered. Aircraft releasing the bombs should vacate the target area as soon as possible and remain at least five miles from the target or above 5000 feet AGL.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.
3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out.

6. Armament selector switch – NAPALM.
7. Station selector switches – AS REQUIRED.

   For the stations from which the fire bombs are to be released, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

8. Bomb arming switch – AS REQUIRED.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

NOTE

If release of fire bombs from TER's has been selected, only one bomb will release from a TER for each depression of the bomb button.

BEFORE LANDING.

NOTE

After dispensing C/B munitions, or in the event of aircraft contamination from C/B munitions, the pilot will request the tower to prepare for isolated parking. At the same time, he will provide the unclassified designator of the agent.

1. Bomb arming switch – SAFE.
2. Armament selector switch – OFF.
3. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-1, CBU-2, CBU-3, CBU-9, CBU-12, and CBU-46 Dispensers – Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

   Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Nose plug – INSTALLED.

6. Tail cone protector – INSTALLED.

7. Tube selection – AS REQUIRED.

8. Electrical receptacle plate – POSITIONED FOR F-100.

9. Detent circuit plug – DISCONNECTED.

   Insure that detent plug is not connected until after a stray-voltage check has been performed.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Tail cone protector – REMOVED.

3. Detent circuit plug – CONNECTED.

4. Nose plug – REMOVED.

5. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

   Move sight mechanical lever to UNCAGE – Note that reticle remains centered on reflector glass.

3. Sight function selector lever – ROCKETS.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. AWRS quantity selector switch – AS REQUIRED.

   Check AWRS power-on light on after switch is set.

6. AWRS release interval switch – AS REQUIRED.

7. AWRS multiplier switch – AS REQUIRED.

8. AWRS mode select switch – AS REQUIRED.

9. Armament selector switch – DISP.

10. Station selector switches – AS REQUIRED.

    For the stations from which the dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.

2. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out after switch is moved to OFF.

3. Dispensers – JETTISON.

   Jettison dispensers in accordance with local procedures and as follows:

   a. Armament selector switch – DISP JETT.

CAUTION

When "dispenser jettison" is selected to release a rocket launcher, a rocket fire signal is alos received at the launcher. Before attempting to jettison rocket launchers, all rockets must be released on target or fired in a safe area to avoid accidental firing in the area of friendly forces.

- When carrying dispensers inboard and outboard, do not use auxiliary release to jettison outboard dispensers prior to emptying the inboard dispensers. Dispenser jettison should be used to jettison dispensers whenever possible. Auxiliary release of outboard dispensers will not allow the AWRS programmer to step to the inboard dispensers. "Dispenser jettison" release will allow the programmer to step to the next station.

b. Station selector switches – AS REQUIRED.

For the stations from which the dispensers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

c. Bomb button – PRESS.

d. Armament selector switch – OFF.

or

e. Applicable external load auxiliary release button – PRESS.

If dispensers are installed on TER's inboard and are to be jettisoned, the TER's will jettison with the dispensers installed.

or

f. External load emergency jettison button – PRESS.

4. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-1, CBU-2, CBU-3, CBU-9, CBU-12 and CBU-46 Dispensers – Not Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Nose plug – INSTALLED.

6. Tail cone protector – INSTALLED.

7. Tube selection – AS REQUIRED.

8. Electrical receptacle plate – POSITIONED FOR F-100.

9. Detent circuit plug – DISCONNECTED.

Insure that detent plug is not connected until after a stray-voltage check has been performed.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Tail cone protector – REMOVED.

3. Detent Circuit plug – CONNECTED.

4. Nose plug – REMOVED.

5. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

3. Sight function selector lever – ROCKETS.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out.

6. Armament selector switch – DISP.

7. Station selector switches – AS REQUIRED.

   For the stations from which dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS REQUIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.

2. Dispensers – JETTISON.

   Jettison dispensers in accordance with local procedures and as follows:

   a. Armament selector switch – DISP JETT.

   CAUTION

   When "dispenser jettison" is selected to release a rocket launcher, a rocket fire signal is also received at the launcher. Before attempting to jettison rocket launchers, all rockets must be released on target or fired in a safe area to avoid accidental firing in the area of friendly forces.

   - When carrying dispensers inboard and outboard, do not use auxiliary release to jettison outboard dispensers prior to emptying the inboard dispensers. Dispenser jettison should be used to jettison dispensers whenever possible. Auxiliary release of outboard dispensers will not allow the AWRS programmer to step to the inboard dispensers. "Dispenser jettison" release will allow the programmer to step to the next station.

   b. Station selector switches – AS REQUIRED.

      For the stations from which the dispensers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

   c. Bomb button – PRESS.

   d. Armament selector switch – OFF.

      or

   e. Applicable external load auxiliary release button – PRESS.

      If dispensers are installed on TER's inboard and are to be jettisoned, the TER's will jettison with the dispensers installed.

      or

   f. External load emergency jettison button – PRESS.

3. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-34 and CBU-42
Dispensers – Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Intervalometer setting – AS REQUIRED.

WARNING

Do not use 70 millisecond setting on CBU-34 or -42 above 460 KTAS dispensing airspeed.

6. Electrical receptacle plate – POSITIONED FOR F-100.

7. Detent circuit plug – DISCONNECTED.

Insure that detent plug is not connected until after a stray-voltage check has been performed.

8. Electrical cable (inside dispenser access panel) – DISCONNECTED.

9. Safety pallet assembly – INSTALLED.

10. Intervalometer safety pin assembly – INSTALLED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Electrical cable (inside dispenser access panel) – CONNECTED.

3. Detent circuit plug – CONNECTED.

4. Check all safety pins and devices – REMOVED.

5. Safety pallet assembly – REMOVED.

6. Intervalometer safety pin assembly – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

Move sight mechanical lever to UNCAGE. Note that reticle remains centered on the reflector glass.

3. Sight function selector lever – ROCKETS.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. AWRS quantity selector switch – AS REQUIRED.

Check AWRS power-on light on after switch is set.

6. AWRS release interval switch – AS REQUIRED.

7. AWRS multiplier switch – AS REQUIRED.

8. AWRS mode select switch – AS REQUIRED.

9. Armament selector switch – DISP.

10. Station selector switches – AS REQUIRED.

For the stations from which the dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.

2. AWRS quantity selector switch – OFF.

Check AWRS power-on light out after switch is moved to OFF.

3. Dispensers – JETTISON.

   Jettison dispensers in accordance with local procedures and as follows:

   a. Armament selector switch – DISP JETT.

   CAUTION

   When "dispenser jettison" is selected to release a rocket launcher, a rocket fire signal is also received at the launcher. Before attempting to jettison rocket launchers, all rockets must be released on target or fired in a safe area to avoid accidental firing in the area of friendly forces.

   - When carrying dispensers inboard and outboard, do not use auxiliary release to jettison outboard dispensers prior to emptying the inboard dispensers. Dispenser jettison should be used to jettison dispensers whenever possible. Auxiliary release of outboard dispensers will not allow the AWRS programmer to step to the inboard dispensers. "Dispenser jettison" release will allow the programmer to step to the next station.

   b. Station selector switches – AS REQUIRED.

      For the stations from which the dispensers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

   c. Bomb button – PRESS.

   d. Armament selector switch – OFF.

      or

   e. Applicable external load auxiliary release button – PRESS.

      If dispensers are installed on TER's inboard and are to be jettisoned, the TER's will jettison with the dispensers installed.

      or

   f. External load emergency jettison button – PRESS.

4. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-34 and CBU-42
Dispensers – Not Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

   Check that valve inspection hole is clear and that pylon actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Intervalometer setting – AS REQUIRED.

   WARNING

   Do not use 70 millisecond setting on CBU-34 or -42 above 460 KTAS dispensing airspeed.

6. Electrical receptacle plate – POSITIONED FOR F-100.

7. Detent circuit plug – DISCONNECTED.

   Insure that detent plug is not connected until after a stray-voltage check has been performed.

8. Electrical cable (inside dispenser access panel) – DISCONNECTED.

9. Safety pallet assembly – INSTALLED.

10. Intervalometer safety pin assembly – INSTALLED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Electrical cable (inside dispenser access panel) – CONNECTED.
3. Detent circuit plug – CONNECTED.
4. Check all safety pins and devices – REMOVED.
5. Safety pallet assembly – REMOVED.
6. Intervalometer safety pin assembly – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.
2. Sight – UNCAGED.

   Move sight mechanical lever to UNCAGE. Note that reticle remains centered on the reflector glass.

3. Sight function selector lever – ROCKETS.
4. Rocket depression angle selector lever – COMPUTED DEPRESSION.
5. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out.

6. Armament selector switch – DISP.
7. Station selector switches – AS REQUIRED.

   For the stations from which dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.
4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.
5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Sight – CAGED.
2. Dispensers – JETTISON.

   Jettison dispensers in accordance with local procedures and as follows:

   a. Armament selector switch – DISP JETT.

   CAUTION

   When "dispenser jettison" is selected to release a rocket launcher, a rocket fire signal is also received at the launcher. Before attempting to jettison rocket launchers, all rockets must be released on target or fired in a safe area to avoid accidental firing in the area of friendly forces.

   - When carrying dispensers inboard and outboard, do not use auxiliary release to jettison outboard dispensers prior to emptying the inboard dispensers. Dispenser jettison should be used to jettison dispensers whenever possible. Auxiliary release of outboard dispensers will not allow the AWRS programmer to step to the inboard dispensers. "Dispenser jettison" release will allow the programmer to step to the next station.

   b. Station selector switches – AS REQUIRED.

      For the stations from which the dispensers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

   c. Bomb button – PRESS.
   d. Armament selector switch – OFF.

      or

   e. Applicable external load auxiliary release button – PRESS.

If dispensers are installed on TER's inboard and are to be jettisoned, the TER's will jettison with the dispensers installed.

or

f. External load emergency jettison button – PRESS.

3. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-7, CBU-28, CBU-30 and CBU-37 Dispensers – Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon Safety Pin – INSTALLED.

2. Pylon Slide Valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and UP.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.

5. Intervalometer setting – AS REQUIRED.

6. Electrical receptacle plate – POSITIONED FOR F100.

7. Detent circuit plug – DISCONNECTED.

Insure that detent plug is not connected until after a stray-voltage check has been performed.

8. Electrical cable (inside dispenser access panel) – DISCONNECTED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Electrical cable (inside dispenser access panel) – CONNECTED.

3. Detent circuit plug – CONNECTED.

4. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

3. Sight function selector lever – ROCKETS.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. AWRS quantity selector switch – AS REQUIRED.

Check AWRS power-on light on after switch is set.

6. AWRS release interval switch – AS REQUIRED.

7. AWRS multiplier switch – AS REQUIRED.

8. AWRS mode select switch – AS REQUIRED.

9. Armament selector switch – DISP.

10. Station selector switches – AS REQUIRED.

For the stations from which the dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

NOTE

After dispensing C/B munitions, or in the event of aircraft contamination from C/B munitions, the pilot will request the tower to prepare for isolated parking. At the same time, he will provide the unclassified designator of the agent.

1. Sight – CAGED.
2. Dispensers – JETTISON.

   Jettison dispensers in accordance with local procedures and as follows:

   a. Armament selector switch – DISP JETT.

   b. Station selector switches – AS REQUIRED.

      For the stations from which the dispensers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

   c. Bomb button – PRESS.

   d. Armament selector switch – OFF.

      or

   e. Applicable external load auxiliary release button – PRESS.

      If dispensers are installed on TER's inboard and are to be jettisoned the TER's will jettison with the dispensers installed.

      or

   f. External load emergency jettison button – PRESS.

3. Armament selector switch – OFF.
4. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out after switch is moved to OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

CBU-7, CBU-28, CBU 30 and CBU-37 Dispensers – Not Using AWRS.

EXTERIOR INSPECTION.

*1. Pylon Safety Pin – INSTALLED.

2. Pylon Slide Valve – HIGH BLOW.

   Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and UP.

*3. Pylon sway braces – TIGHT.

4. Electrical pullout cable – CONNECTED AND SAFETIED.
5. Intervalometer setting – AS REQUIRED.
6. Electrical receptacle plate – POSITIONED FOR F100.
7. Detent circuit plug – DISCONNECTED.

   Insure that detent plug is not connected until after a stray-voltage check has been performed.

8. Electrical cable (inside dispenser access panel) – DISCONNECTED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.
2. Electrical cable (inside dispenser access panel) – CONNECTED.
3. Detent circuit plug – CONNECTED.
4. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

3. Sight function selector lever – ROCKETS.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. AWRS quantity selector switch – OFF.

   Check AWRS power-on light out.

6. Armament selector switch – DISP.

7. Station selector switches – AS REQUIRED.

   For the stations from which dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

   Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

   Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

   Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bomb button – PRESS.

BEFORE LANDING.

NOTE

After dispensing C/B munitions, or in the event of aircraft contamination from C/B munitions, the pilot will request the tower to prepare for isolated parking. At the same time, he will provide the unclassified designator of the agent.

1. Sight – CAGED.

2. Dispensers – JETTISON.

   Jettison dispensers in accordance with local procedures and as follows:

   a. Armament selector switch – DISP JETT.

   b. Station selector switches – AS REQUIRED.

      For the stations from which the dispensers are to be jettisoned, move the station selector switches to NORM. Check all other station selector switches at SAFE.

   c. Bomb button – PRESS.

   d. Armament selector switch – OFF.

      or

   e. Applicable external load auxiliary release button – PRESS.

      If dispensers are installed on TER's inboard and are to be jettisoned, the TER's will jettison with the dispensers installed.

      or

   f. External load emergency jettison button – PRESS.

3. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

SUU-25 Series Flare/Marker Dispenser – Not Using AWRS.

NOTE

The AWRS should not be used for dispensing flares or markers from the SUU-25 for two reasons: single-tube ejection cannot readily be accomplished; the AWRS will not step from one dispenser to another or from one pair of dispensers to a second pair.

- If the AWRS programmer is not installed, insure that the programmer wiring harnesses are plugged into the bypass adapter.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Electrical connecter plug – SECURE AND SAFETIED.

*5. Forward shorting device – INSTALLED AND SAFE.

6. Dispenser selector switch – SINGLE.

7. Flares or markers – INSTALLED.

NOTE

Fuze settings cannot be visually checked after installation of flares or markers in dispenser. Check with munitions personnel to insure that fuzes are properly set.

8. Dispenser tube safety pins – INSTALLED.

9. Detents – FULLY SEATED.

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.

2. Forward shorting device – ARMED.

3. Check all safety pins and devices – REMOVED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. AWRS quantity selector switch – OFF.

Check AWRS power-on light out.

3. Armament selector switch – DISP.

4. Station selector switches – AS REQUIRED.

For the stations from which dispensers are to be operated, move the station selector switches to NORM when mission dictates. Check all other station selector switches at SAFE.

RELEASE.

1. Altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired airspeed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

Maneuver airplane so as to arrive at desired flare release point.

6. Bomb button – PRESS.

BEFORE LANDING.

1. Armament selector switch – OFF.

2. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

SUU-20/A, /A(M), A/A, B/A Dispensers. ■

Refer to "SUU-20/A, A/A Dispenser" under "Airplanes Not Changed by T.O. 1F-100D-632," in this section.

NOTE

If the AWRS programmer is not installed, insure that the programmer wiring harnesses are plugged into the bypass adapter.

SUU-21/A Dispenser.

Refer to 'SUU-21/A Dispenser' under 'Airplanes Not Changed by T.O. 1F-100D-632', in this section.

AF/B37K-1 Bomb Container.

NOTE

If the AWRS programmer is not installed, insure that the programmer wiring harnesses are plugged into the bypass adapter.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

4. Manual release levers – SAFETIED.

5. Electrical connector plug – SECURE AND SAFETIED.

*6. Bombs – SECURE.

Check for security and proper mounting. Slight horizontal and vertical movement of the bomb is permissible.

7. Racks – FULLY COCKED.

Check, through rack inspection holes, that solenoid pin engagement with release lever locking assembly is between 0.06 and 0.095 inch (50 percent engagement).

*8. Container sway braces – TIGHT.

9. Pylon loading switch RH/LH outboard – CHECK DISPENSERS.

NOTE

Notify armament personnel if in wrong position.

BEFORE TAKEOFF.

1. Check all safety pins and devices – REMOVED.

2. Ejector cartridges – INSTALLED.

BEFORE RELEASE.

1. Mode selector switch – MANUAL.

2. Sight – UNCAGED.

3. Sight function selector lever – ROCKETS.

4. Rocket depression angle selector lever – COMPUTED DEPRESSION.

5. AWRS quantity selector switch – OFF.

Check AWRS power-on light out.

6. Armament selector switch – DISPENSERS.

7. Station selector switches – AS REQUIRED.

When mission dictates, move right-hand outboard station selector switch to NORM. Check all other station selector switches at SAFE.

RELEASE.

1. Dive angle/altitude – AS DESIRED.

Maneuver airplane so as to arrive on final approach to target at preplanned dive angle or altitude.

2. Airspeed – AS DESIRED.

Allow airspeed to build up to desired speed at release point.

3. Throttle – AS REQUIRED.

4. Speed brake – AS REQUIRED; RETRACT BEFORE RELEASE.

5. Target – TRACK.

Allow pipper to arrive at aiming point just as airplane arrives at desired release point.

6. Bonb button – PRESS.

BEFORE LANDING.

1. Armament selector switch – OFF.

2. Sight – CAGED.

AFTER LANDING.

1. Check all safety pins and devices – INSTALLED.

A/A37U-15 TOW-TARGET SYSTEM.

NOTE

If the AWRS programmer is not installed, insure that the programmer wiring harnesses are plugged into the bypass adapter.

EXTERIOR INSPECTION.

*1. Pylon safety pin – INSTALLED.

2. Pylon slide valve – HIGH BLOW.

Check that valve inspection hole is clear and that pylon valve actuator arm has been pushed fully forward and up.

*3. Pylon sway braces – TIGHT.

*4. Tow-target pod – SECURE, INSPECT.

Insure that all panels on pod are securely fastened and that pod Fiberglas body is not cracked, broken, or damaged in any manner.

5. Electrical connecter plug – SECURE AND SAFETIED.

*6. Tow-reel housing – SECURE.

Check that locking shaft is bottomed in housing.

7. Reel spool – SAFETY-WIRED.

Insure that reel is safetied in two places to prevent freewheeling.

8. Reel spool cable – TIGHTLY WOUND.

NOTE

The cable is not crosswound or taped.

9. Nose guide pin – ALINED IN CHANNEL.

Insure that nose guide pin of dart target is inside nose guide channel and alined with balance mark.

10. Tow-cable routing (parachute recovery system) – CHECK.

The cable should be routed from the bottom of the tow reel rearward through the cable-cutter mechanisms and out the rear of the pod.

a. Tow cable and parachute canister – CONNECTED.

Insure that tow cable is connected to forward eye of recovery parachute canister.

b. Nylon rope and parachute canister – CONNECTED.

Insure that nylon leader rope is connected to aft eye of recovery parachute canister.

c. Recovery parachute canister – SECURE.

Insure that canister is securely taped (four turns) to aft overhand of reel pod.

11. Tow cable routing (no-chute system) – CHECK.

The cable should be routed from the bottom of the tow reel, rearward through the cable-cutter mechanisms, out the rear of the pod, and connected to the nylon leader rope.

WARNING

Improper routing of the tow cable may prevent normal release of the dart target.

12. Nylon rope and bridle loop – CONNECTED.

Insure that nylon leader rope is safety-wired to dart target wind and connected to bridle loop.

*13. Launcher sway braces – TIGHT.

Insure that sway braces are holding dart firmly but are not warping wings.

14. Launcher manual release lever – LOCKED AND SAFETIED.

*15. Dart target – SECURE ON LAUNCHER.

Apply pressure to rear of dart to check for excessive lateral movement and overall security.

16. Dart wings – CHECK.

    Insure that wings are not cracked, warped, or distorted.

17. Main gear extension – 10-7/16 INCHES (+ ¼ inch).

BEFORE TAKEOFF.

1. Ejector cartridges – INSTALLED.
2. Check all safety pins and devices – REMOVED.

BEFORE-LAUNCH (UNREELING).

1. Flaps – INTERMEDIATE or DOWN.

   If flaps were retracted after takeoff, lower flaps to intermediate or down position to improve low airspeed maneuvering qualities.

2. Airspeed – 190 KNOTS IAS.

   Maintain 190 knots IAS in unaccelerated (1 G) flight until cable has completely unreeled (approximately 2-1/2 minutes).

3. Altitude – AS DIRECTED.
4. Throttle – AS REQUIRED.

   Use throttle as necessary to maintain 190 knots IAS during cable reel-out. (Maintain level flight or climb at 190 knots IAS in Military Thrust.)

LAUNCH (UNREELING).

1. Left wing outboard pylon loading selector switch – ROCKETS.
2. Armament selector switch – RKTS.
3. Station selector switches – AS REQUIRED.

   Move left wing outboard station selector switch to NORM when mission dictates. Check all other station selector switches at SAFE.

4. Bomb button – PRESS.

AFTER-LAUNCH (UNREELING).

1. Flaps – UP.

   Retract flaps after cable has reeled out.

2. Throttle – AS REQUIRED.
3. Climb airspeed – 300 KNOTS IAS (RECOMMENDED).
4. Dart stability – CHECK.

   Check that dart does not roll at climb airspeed.

BEFORE RELEASE.

NOTE

If target has been hit by gunfire, do not exceed 300 knots IAS en route to release area. If heavy damage has been inflicted, a lower airspeed may be required (200 knots IAS minimum).

1. Flaps – INTERMEDIATE OR DOWN.

   Lower flaps to intermediate or down position to improve low airspeed maneuvering qualities.

2. Airspeed – 180 KNOTS IAS.

   Maintain 180 knots IAS in straight-and-level (1 G) flight.

NOTE

Speed should be stabilized at 180 knots IAS for a minimum of 1 minute before release, to insure that the dart has stabilized at the speed of the tow airplane.

3. Altitude (high-altitude chute recovery system) – 2,000 FEET AGL.
4. Altitude (Low-altitude chute/no-chute recovery system) 1,000 FEET AGL.
5. Throttle – AS REQUIRED.

   Use throttle as necessary to maintain 180 knots IAS for release.

RELEASE.

1. Normal Release.
   a. Station selector switches – AS REQUIRED.

      Check left wing outboard station selector switch at NORM and all other station selector switches at SAFE.

   b. Bomb button – PRESS.

      Press bomb button to fire primary cutter squib.

2. Auxiliary release (backup cutter).
   a. Left wing outboard pylon loading selector switch – DISPENSERS.
   b. Armament selector switch – DISP.
   c. Bomb button – PRESS.

      Press bomb button to fire backup cutter squib.

AFTER RELEASE.

1. Flags – UP.
2. Armament selector switch – OFF.

AFTER LANDING.

1. Check all safety pins – INSTALLED.

SECTION III

EMERGENCY PROCEDURES

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INTRODUCTION.

The information in this section considers only the emergency instructions related to nonnuclear weapons. Basic emergency procedures, such as engine failure (which may require jettisoning of all external stores), airplane fire or explosion, etc., are covered in the Flight Manual for the aircraft concerned.

ARMED HIGH-EXPLOSIVE BOMBS.

If, during flight, arming wires are known or suspected to be extracted from high-explosive bomb fuzes, allowing the bomb fuze to arm while on the airplane, use the external load emergency jettison handle to release the bombs. This method of release will not activate the store ejector cartridges in the pylons, and should preclude bomb fuze functioning due to the concussion forces from the detonating ejector cartridges.

EVACUATION CRITERIA.

Table 3-1 shows withdrawal time and withdrawal distance for the various weapons, in case they are enveloped in fire. Withdrawal time is defined as the time from when the weapon is enveloped in flames until completion of withdrawal to the specified withdrawal distance. Withdrawal distance (for nonessential personnel) is defined as the minimum permissible distance to which these personnel should be withdrawn. In case a weapon is enveloped by fire, it is necessary to determine the amount of time available to fight the fire and evacuate the area before weapon detonation. At the expiration of the withdrawal time, the weapon may be expected to function (detonate, burn, or release toxic agents).

[C] – F-100C Airplanes
[D] – F-100D Airplanes
[F] – F-100F Airplanes

Table 3-1. Evacuation Criteria – Withdrawal Time and Withdrawal Distance

NOMENCLATURE	WITHDRAWAL TIME IN MINUTES	WITHDRAWAL DISTANCE (NONESSENTIAL PERSONNEL)
Bomb, Demolition, BLU-31/B	5	2,000 feet
Bomb, Fire, BLU-1 ( )	N/A	500 feet
Bomb, Fire, BLU-27( )	N/A	500 feet
Bomb, Fire, BLU-32( )	N/A	500 feet
Bomb, Gas, MC-1	5	2 miles downwind, 1 mile sidewind, or 1 mile upwind.
Bomb, GP, M65A1	5	2,000 feet
Bomb, GP, M117 and M117 (R)	5	2,000 feet
Bomb, GP, MK-81	5	2,000 feet
Bomb, GP, MK-82	5	2,000 feet
Bomb, GP, MK-82 Snakeye I	5	2,000 feet
Bomb, GP, MK-83	5	2,000 feet
Bomb, Leaflet, M129E1	N/A	500 feet
Bomb, Practice, BDU-33/B, BDU-33A/B, MK-106	N/A	500 feet
Cartridge, 20 MM, HEI	1	2,000 feet
Cartridge, 20 MM, API & TP (Ball)	N/A	500 feet
Pylon Ejector Cartridge, ARD 446-1	N/A	500 feet
Dispenser and Bomb, CBU-1, -2, -3, -7, -9, -12, -24, -28, -29, -30, -34, -37, -42, -46, -49, -52, -53, -54, -58, and -71	1.5	2,000 feet
Dispenser, SUU-25 (With Flares or Markers Loaded)	N/A	500 feet
Dispenser, Leaflet, MK-12 Mod 0	N/A	500 feet

Table 3-1. Evacuation Criteria – Withdrawal Time and Withdrawal Distance (Cont)

NOMENCLATURE	WITHDRAWAL TIME IN MINUTES	WITHDRAWAL DISTANCE (NONESSENTIAL PERSONNEL)
Rocket Launchers (With 2.75-Inch FFA Rockets Loaded), LAU-3/A, LAU-32/A, LAU-32B/A, LAU-59/A, and LAU-68/A	2.5	2,000 feet
Rocket, HE (2.75-Inch (A1) Mods)	2.5	2,000 feet
Rocket, Flechette, 2.75-Inch (WDU-4/A)	2.5	2,000 feet
Missile, AIM-9B/E/J	1.75	2,000 feet
Rocket, Target, 5-Inch, TDU-11/B	2	500 feet

WARNING

Personnel must remain clear of the area fore and aft of missiles, rockets and rocket motors.

HUNG ORDNANCE.

Hung ordnance is the term used when an unsuccessful attempt has been made to release or jettison a weapon from the airplane. If a hung ordnance condition occurs, proceed as follows:

1. All armament switches and circuit breakers – RECHECK CORRECTLY SET.
2. Ordnance – ATTEMPT RELEASE ON TARGET.

WARNING

The bomb arming switch shall be moved to SAFE before flying over friendly territory with hung ordnance.

3. If ordnance fails to release, attempt to jettison stores in a safe area.

EXTERNAL LOAD JETTISON.

The following procedures do not apply to special stores or to airplane emergencies where all external stores and pylons shall be jettisoned. The procedures apply to the condition where stores have failed to release by use of the normal operating circuits.

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632.

NOTE

If electrical power is not available, only loads not requiring forced ejection can be jettisoned, and then only by use of the external load emergency jettison handle.

1. External Load auxiliary release buttons – PRESS.

   Press buttons one at a time for the stations from which the stores are to be released.

2. Armament selector switch – JETT ALL – Press bomb button.

3. External load emergency jettison button – PRESS.

4. External load emergency jettison handle – Pull to full extension.

Only loads not requiring forced ejection can be jettisoned by pulling the external load emergency jettison handle.

AIRPLANES CHANGED BY T.O. 1F-100D-632.

NOTE

If electrical power is not available, only loads not requiring forced ejection can be jettisoned, and then only by use of the external load emergency jettison handle.

1. Armament selector switch – PYLON JETT.

2. Station selector switches – AS REQUIRED – Press bomb button.

For the stations from which the stores are to be released, move the related station selector switches to JETT, then press bomb button.

3. External load auxiliary release buttons – PRESS.

Press buttons one at a time for the stations from which the stores are to be released.

4. External load emergency jettison button – PRESS.

5. External load emergency jettison handle – Pull to full extension.

NOTE

Bombs installed on triple ejector racks cannot be released by means of the external load emergency jettison handle.

- Only loads not requiring forced ejection can be jettisoned by pulling the external load emergency jettison handle.

MISSILE EMERGENCY LAUNCH.

To launch missiles in an emergency during flight:

C 1. Safety lock switch – ARM.

2. Missile safe launch button – PRESS.

WARNING

Missiles should be safe-launched into a safe area because of their range as unguided ballistic rockets.

IN-FLIGHT MISSILE MALFUNCTION.

When all switches are properly set, and the missile fails to fire after the trigger has been pressed to the second detent, it should first be considered a hangfire, and the following procedure should be used:

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632.

1. Missile master switch – Reset.

C 2. Safety lock switch – SAFE.

3. Trigger safety switch – CAMERA.

AIRPLANES CHANGED BY T.O. 1F-100D-632.

1. Missile master switch – Reset.

2. Gun-missile switch – SAFE.

The following applies to all aircraft:

NOTE

Consider a potential hangfire period for 15 minutes from the time step 1 is accomplished, and fly a course or courses to minimize the missile hazard if firing occurs.

- After 15 minutes, during which no smoldering occurs, consider the missile a misfire and resume normal operations or return to base.

- If smoldering (hangfire) is evident and firing does not occur, safe-launch the missile in a safe direction and area.

WARNING

Do not return a hangfire missile to base.

NOTE

If it is not practical to remain in flight for the 15-minute hangfire period, safe-launch the missile in a safe, clear and unpopulated area.

SECTION IV

SUPPLEMENTARY DATA

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HARMONIZATION.

NOTE

Specific information in this section on harmonization and pursuit curve formula derivations and calculations pertains only to the 20 mm guns. Information on the 7.62 mm guns will be supplied when available.

Introduction. The fighter airplane, with its advantages of high speed and maneuverability, becomes a deadly weapon when these characteristics are coupled with accurate firepower. To obtain accurate firepower capability, guns and sight must be carefully alined with the airplane. In this alinement process (known as harmonization), projectile dispersion is controlled and a correction for parallax is made. Theoretical considerations are discussed first, followed by mechanical aspects of harmonization.

Parallax Error. Parallax error exists because the sight line is above the gun line. There is no provision within the fire control system to correct parallax error. Therefore, a constant underlead condition exists equal to the distance between the sight line and the gun line. By depressing the zero prediction sight line (OPSL) until it intersects the mean fixed bore line (MFBL) at the harmonized range, all parallax error will be eliminated at that specific range. A small parallax error remains at all other ranges. (See figure 4-1.)

Parallax Correction. An important step in establishing a harmonization program is to determine the most desirable range for parallax correction. This decision is contingent upon the specific mission which the fighter will be required to accomplish. In general, mission requirements can be classified into two major areas, aerial gunnery and ground gunnery (strafing). The full computing function is normally used in aerial gunnery and the fixed sight in ground gunnery. It is important that tracking index-to-projectile impact relationship be examined in these two sight functions, to determine the best harmonization range.

Aerial Gunnery (Full Computing Function). When good tracking exists in the full computing function and accurate range information is being fed into the sight, the sight computes corrections for gravity drop, trajectory shift, and lead for target motion. The only remaining error is parallax.

In the F-100, the sight line is 56 inches above the mean fixed bore line. If no correction is made, an inherent 56-inch underlead condition will exist at all firing ranges. When the sight is depressed to intersect the mean fixed bore line at any given range, the tracking index will indicate bullet impact at that range.

The angle formed between the sight line and the mean fixed bore line at the longer ranges is smaller than the angle formed at the shorter ranges. This fact is significant in determining the best harmonization range for a primary mission of aerial gunnery. Although the tracking index will indicate the exact point of impact only at the harmonized range, there is less tracking index impact error over a

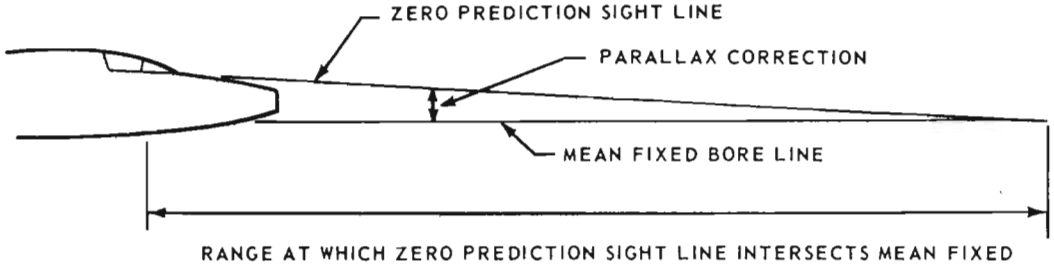

ZERO PREDICTION SIGHT LINE
PARALLAX CORRECTION
MEAN FIXED BORE LINE
RANGE AT WHICH ZERO PREDICTION SIGHT LINE INTERSECTS MEAN FIXED BORE LINE (PARALLAX ERROR IS ZERO AT THIS RANGE).

Figure 4-1. Parallax Error

greater span of ranges when parallax error is corrected for at longer ranges. (See figures 4-2 and 4-3.) For this reason, units having a primary aerial gunnery mission should harmonize their airplanes for the longer ranges (2,000 to 2,500 feet).

Ground Gunnery (Fixed Sight). Then mechanically caged, the sight will not compute for gravity drop or trajectory shift. The electrical and mechanical cage sight lines (ECSL and MCSL) are superimposed and depressed 1.1 mils below the zero prediction sight line. This setting is equivalent to the required gravity drop correction at 850 feet only. Tracking index-to-impact relationship deteriorates as the harmonized range increases, primarily because of the increased gravity drop corrections required at the longer ranges. Trajectory shift errors can be eliminated by the firing under flight conditions which will aline the gun line with the flight path. When it is not practical to fly under these conditions, trajectory shift can be counteracted by adjusting the sight picture. The gravity drop corrections required on long ranges are large, making impractical sight picture adjustments for gravity drop. Consequently, shorter harmonization ranges (1,000 to 1,500 feet) are better when the primary mission is ground gunnery. (See figure 4-4.)

Tracking Index-to-Impact Relationship. Certain training missions and tactical situations require that a compromise be made if a dual or multipurpose mission is anticipated. In this case, the best harmonization range should be determined by examining the tracking index-to-impact relationships under the specific firing conditions, and a harmonization range should be selected to best suit all situations. (See figure 4-4.)

Projectile Dispersion Control. A study of 20 mm projectile dispersion patterns reveals that the 20 mm cannon is not a precision instrument. Consequently, all projectiles fired do not hit the aiming point. This pattern is a cone, measured in mils, from the gun muzzle to the circumference of a circle containing all the hits. The dispersion criteria for 20 mm ammunition are as follows: at least 75 percent of the projectiles fired must hit within a 4-mil cone, and 100 percent must hit within an 8-mil cone at all ranges. (See figure 4-5.)

In addition to imperfections of the 20 mm cannon, there are other factors affecting the trajectory — powder temperature, age, air resistance, and gravity are the major considerations. Minor considerations are present but not important in fixed gunnery. The harmonization process partially controls these variables so that a lethal concentration of fire can be delivered from the fighter airplane.

The guns in a fighter airplane can be harmonized to provide different projectile impact patterns. One approach is to aline all gun lines parallel. This results in increased total dispersion with a consequent increase in hit probability;

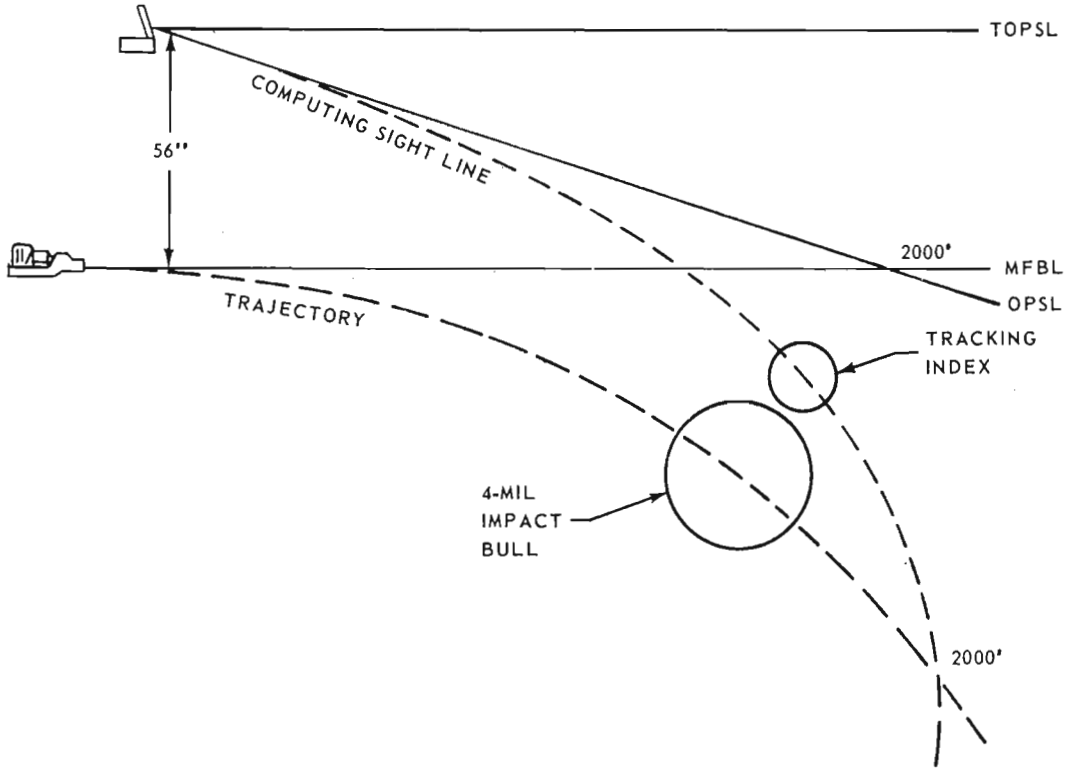


Figure 4-2. 2000' Harmonization

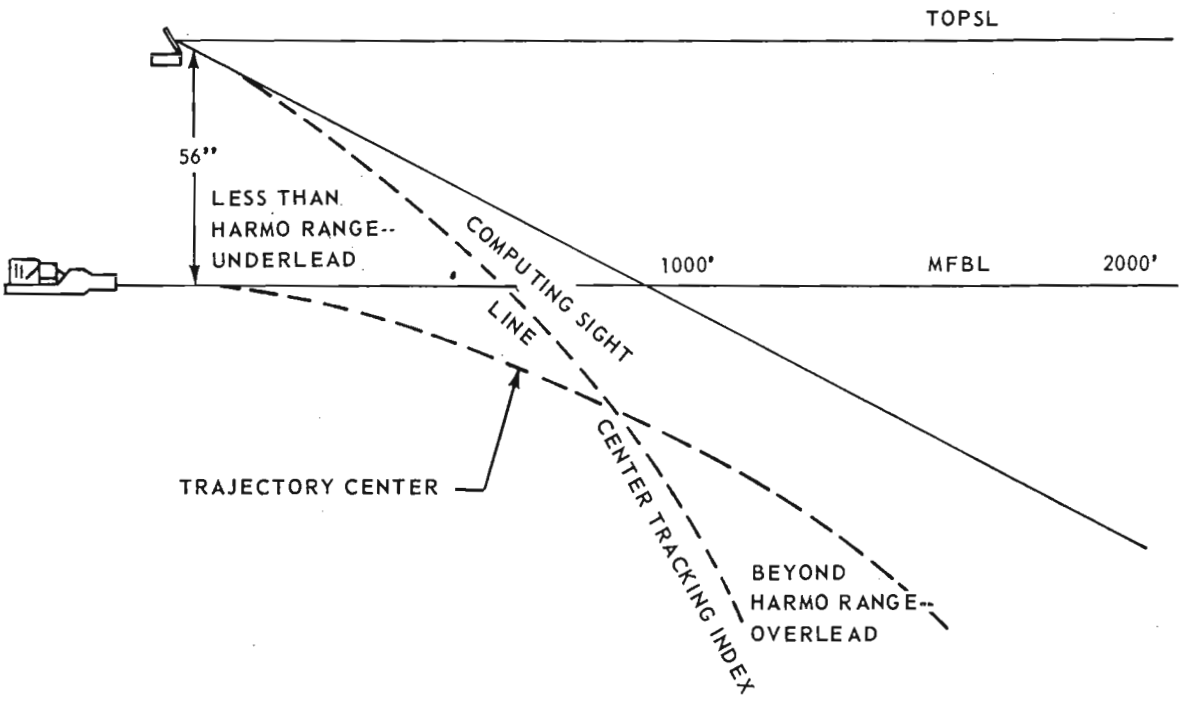


Figure 4-3. 1000' Harmonization

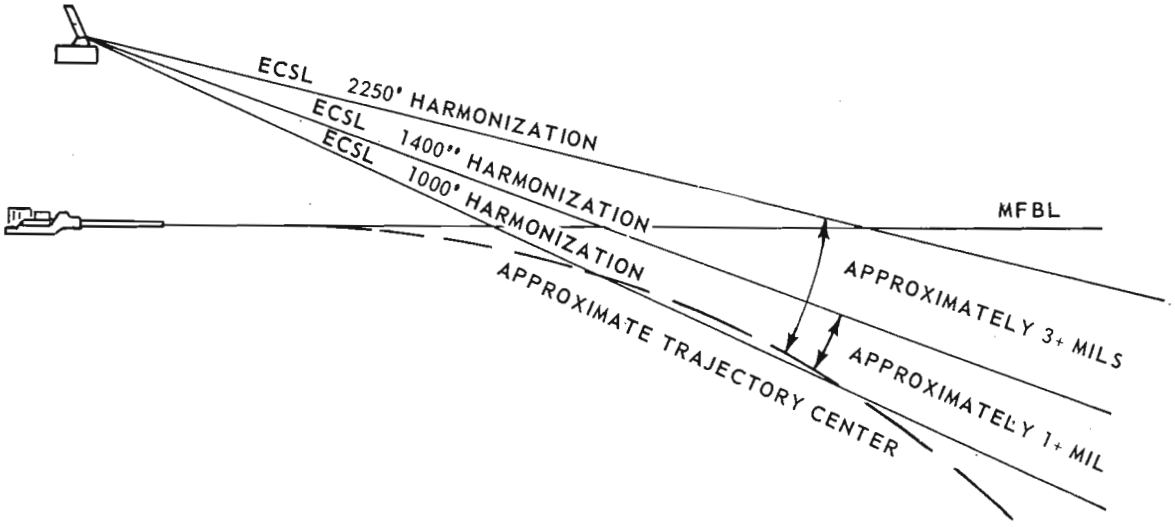


Figure 4-4. Relationship of Center of Tracking Index to Center of Projectile Impact For Different Harmonized Ranges-Fixed Sight Firing (Mechanical or Electrical Caged)

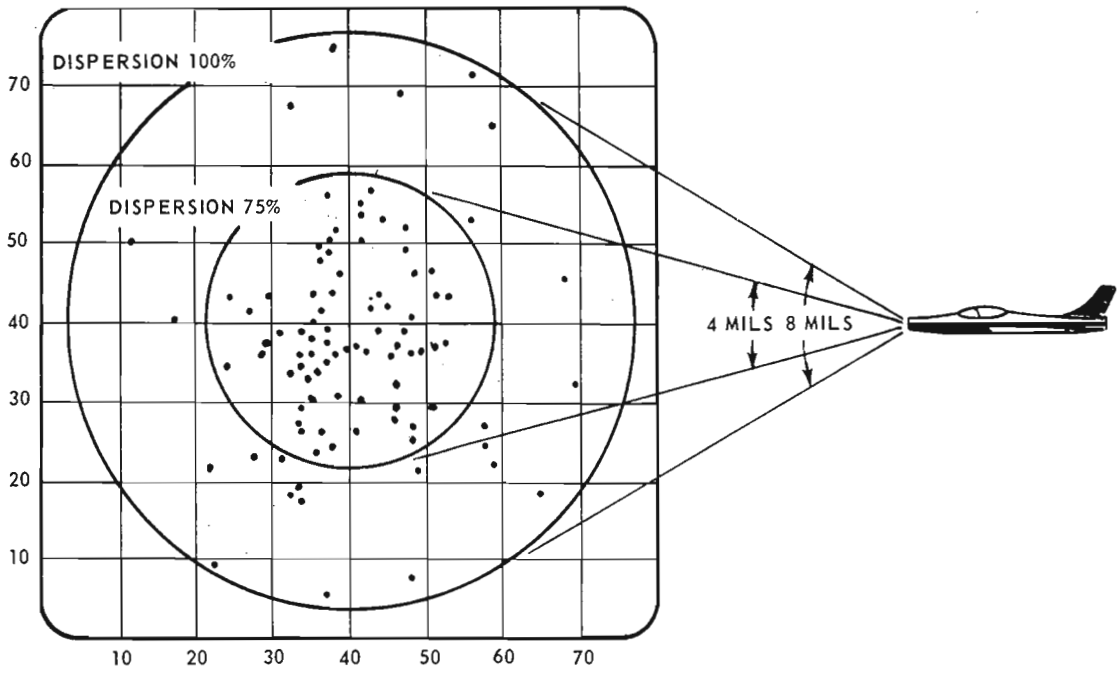


Figure 4-5. Projectile Dispersion Pattern

however, projectile density is sacrificed when this is done. When maximum projectile density is desired, all gun lines should be adjusted to converge at a given range ahead of the airplane. In an airplane equipped with several guns, it is possible to adjust one set to converge at one range and the other set to converge at a different range.

Harmonization Target Construction. Design of harmonization targets is predicated on the type of airplane to be harmonized, the length of the firing-in range and parallax correction range desired, dispersion criteria for the weapons, and the desired projectile pattern. Detailed information on target construction is contained in T.O. 1F-100D(I)-2-9 and T.O. 1F-100F(I)-2-9.

Boresight Versus Fire-In. Boresighting can be accomplished inside hangars during inclement weather or when no firing-in range is available. The guns are alined with a target (1,000-inch range) by adjusting the rear gun mounts while sighting through the gun bore with a breech bore sight tool. It does not provide a check on projectile dispersion or the operation of the guns. Small undetected errors in bore-sighting may result in large impact errors at longer ranges.

Firing-in permits the guns to seat in the gun mounts, thus minimizing the factors affecting dispersion. Operation of the guns can be checked, thereby minimizing malfunctions and ineffective missions. Fire-in is usually accomplished on firing ranges at distances varying from 1,000 to 2,250 feet in length. A minimum 1,000-foot fire-in range is preferred because parallax can be corrected without use of special optical equipment and a more discernible picture of projectile dispersion is presented.

When To Harmonize. An airplane should be harmonized after any of the following:

a. Major airplane inspection

b. Sight head change.

c. Gun barrel change.

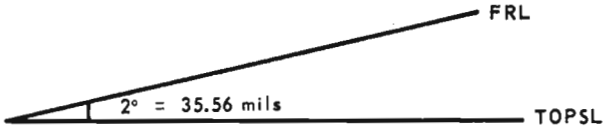
d. New gun mounts installed.

e. When it becomes apparent through firing that the airplane is not correctly harmonized.

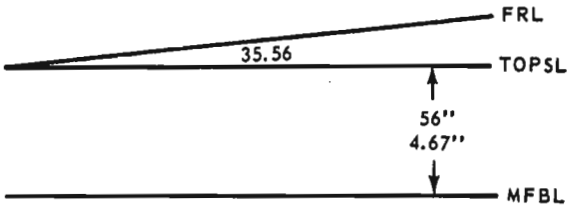
Procedures for Harmonization. Procedures for harmonization follow a similar pattern for all fighter airplanes. Specific procedures for harmonizing the F-100D and F-100F are contained in T.O. 1F-100D(I)-2-9 and T.O. 1F-100F(I)-2-9.

How to Compute Sight Depression. Through the harmonization processes, the sight line is depressed to aline the sight with the guns. It is imperative to know the number of mils the electrical caged sight line has been depressed from the fuselage reference line when a bombing or rocketry sight setting is being computed. This depression can be determined in four steps (the F-100 Airplane is harmonized for a range of 1,400 feet and used in the following computation):

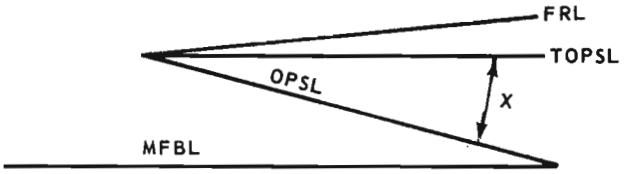
1. Find the number of mils the true zero prediction sight line (TOPSL) is depressed below fuselage reference line (FRL). This is the angular distance between the fuselage reference line and mean fixed bore line.



2. Find the linear distance between TOPSL and MFBL.



3. Find the number of mils the OPSL is depressed below TOPSL.



Since X depression is an angular measurement, convert this to mils by the following formula:

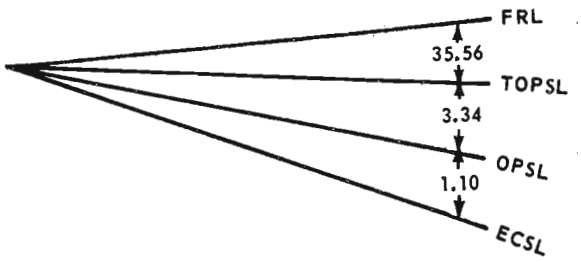
$$\frac{X}{1{,}000} = \frac{\text{Parallax (in feet)}}{\text{Range}}$$

Since we harmonize at 1,400 feet, and parallax is 4.67 feet, solve as follows:

$$\frac{X}{1{,}000} = \frac{4.67}{1{,}400};$$

$$X = 3.34 \text{ mils}$$

4. Find the total number of mils depression by adding the amount which the OPSL is depressed below the FRL to the amount that the ECSL is depressed below the OPSL. The ECSL is 1.1 mils below the OPSL.



Adding: 35.56 mils (TOPSL below FRL)
3.34 mils (OPSL below TOPSL)
1.10 mils (ECSL below OPSL)
40.00 mils total depression

FILM ASSESSING.

Introduction. A conscientious assessing program will result in consistently higher gunnery scores, better trained and more proficient aircrews, higher sight incommission rates, and, most important, maximum benefit from each firing and bombing event.

The well-informed pilot uses the gun camera to determine errors in firing range, slant range, dive angle, alinement with the target, and offset release aiming point. During combat, either aerial or ground attack, the gun camera often provides the only method of recording the desctruction inflicted by the fighter. Through proper interpretation or assessment of film taken by airplane cameras, methods of subsequent attack and vulnerable points of enemy targets can be determined. Proper assessment is an invaluable tool for improving proficiency as well as providing intelligence information.

Procedures are included for determination of range, angle-off, and/or dive angle; assessing equipment; and chart construction. Descriptions of the various gun cameras and their specific characteristics are not included, since guidance for their operation is supplied in applicable flight manuals.

Assessing Aerial Attack Film. To assess accuracy of attack against an aerial target, the pilot must evaluate three things: range, angle-off, and line error. The procedures for determining these items are in the paragraphs following.

RANGE. Run film until first firing frame of the gunnery pass appears. Using calipers, transfer the width of the target image to the aerial attack estimate assessing chart for the type of lens and size of target being used. Lay this width down the vertical axis of the chart from the baseline. (See figure 4-6.) Compare this assessed range with the desired firing range and note findings.

ANGLE-OFF. Two methods are commonly used to measure and assess angle-off. In one method, the observable length of the target is measured and this measurement is applied to the assessment chart. The other method involves measurement of a known distance on the target. Again, the measurement is applied to the appropriate assessing chart. Either method is satisfactory. The one to be used should be determined by the fighter weapons officer after considering target size, definition of film, and personal preference. After an assessing chart has been constructed for use with thechosen method, use calipers to measure the foreshortened target dimension. Lay this distance off on the horizontal axis of the chart, with one point of the calipers on the vertical axis at the range figure as previously determined. The other point of the calipers will then fall on or between the angle-off lines which emanate from a point at the maximum range of the chart. Interpolation between these radial ines gives the angle-off.

LINE ERROR. The distance, in mils, which the tracking index is displaced from the aiming point on the target is known as line error. This distance if found by measuring the distance, in inches, between the aiming point on the

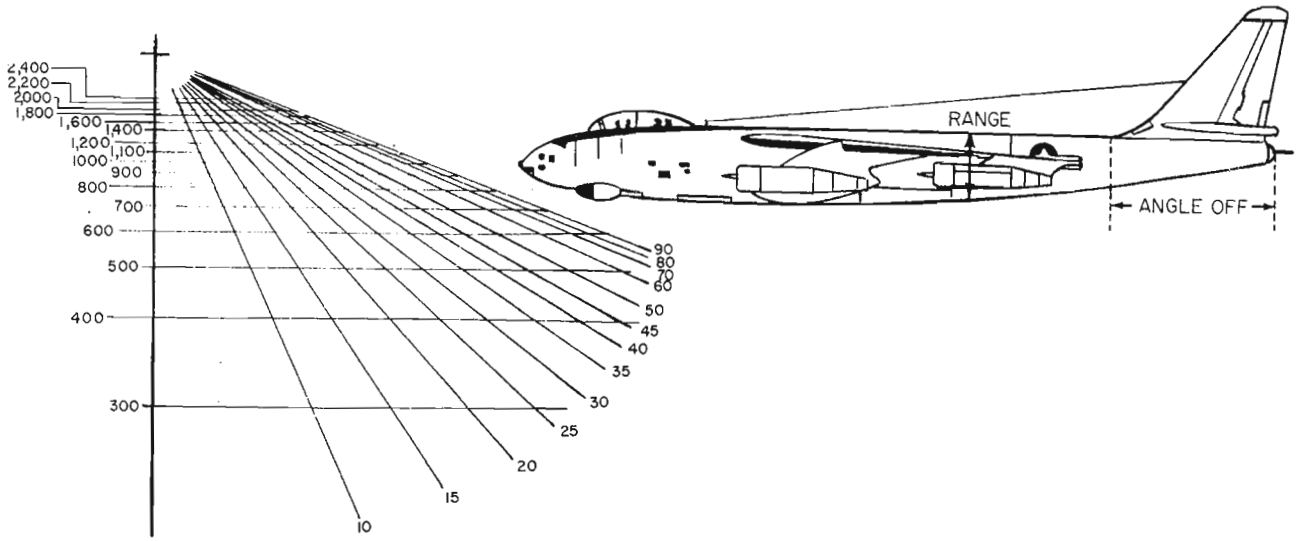


Figure 4-6. Aerial Attack Assessing Chart for 35-MM Lens B-47 Aircraft

target and the tracking index. The line error is this measurement read in mils (1 inch equals 10 mils). Therefore, 1 inch of tracking index displacement would equal about 10 feet of impact error at 1,000-foot slant range. Repeat the process at each 10-frame interval.

DART TARGET. Small targets, such as the dart, are quite often poorly defined on gun camera film. In addition, they are generally fired upon at angles-off between 5 and 15 degrees. This combination of factors and the geometric shape of the dart severly impair the pilot's ability to accurately assess angle-off. Consequently, it is feasible to assess only range in aerial dart training. (See figure 4-7.)

SUMMARY. If more than one firing pass is performed, note assessment information for range, angle-off and line error for each pass and compare the results. Usually one or more consistent discrepancies will become evident. Repeated correlation between studied discrepancies in the assessment room and the in-flight attack will quickly achieve the desired objective: consistency of range, angle-off, and sight picture in the aerial attack.

Assessing Ground Attack Film. Assessing film of dive-bombing or rocket deliveries requires a knowledge of the target's size and a comparison of its size to the dimensions of the assessed image on an assessing chart is constructed with a known proportional relationship to the target's size, thereby permitting determination of the airplane dive angle and firing slant range. The procedures for determining these items are in the paragraphs following.

Run film through the projector unitl the opening frame of the pass appears. With calipers, measure the major axis — the axis of the target circle perpendicular to the diving airplane's path over the ground. (See figure 4-8.) Lay this measurement off along the vertical axis of the ground attack assessing chart (designed for use with a camera lens of a specified focal length and for a target of a specified size). This reading gives the slant range in feet. (See figure 4-9.)

Measure the minor axis — the axis of the target parrallel to the diving airplane's path over the ground. Transfer this measurement to the horizontal axis of the ground attack assessing chart. Place one point of the calipers on the vertical axis at the range figure as previously determined. The other point of the calipers will then fall on or between the angle-off lines which emanate from a point at the maximum range of the chart. Interpolation between the diverging dive-angle lines gives the dive angle in degrees.

Other Uses of Assessing Charts. Increased emphasis on gun-camera use in simulated attacks against other airplanes has generated a need for a standard measurable index to be used in assessing film obtained on those missions. A study of USAF airplanes determined which airplane features were suitable for this purpose. For a bomber, the fuselage diameter was determined to be a satisfactory range index. However, the vertical stabilizer of fighter airplanes was found to be a more suitable reference in level attacks during which both the fighter and the target airplanes are in the same plane of reference. With high-side and low-side attacks, the foreshortening effect makes the stabilizer an unreliable index, thus making it necessary to develop special charts for specific attacks. (See figure 4-10.)

If attacks are made in the vertical plane on fighters, unit fighter weapons officers can apply formulas to construct valid assessing charts.

Assessing Room Equipment. The film assessing room should include the following equipment:

a. 16 mm motion picture projector.

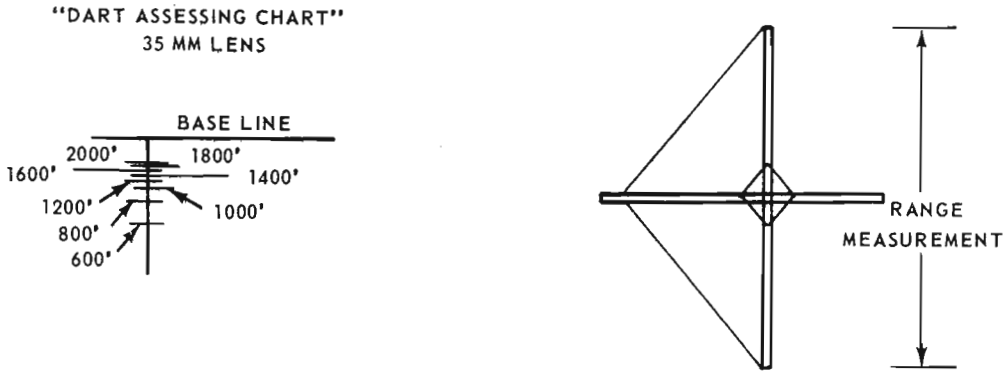


Figure 4-7. "Dart Assessing Chart" 35 MM Lens

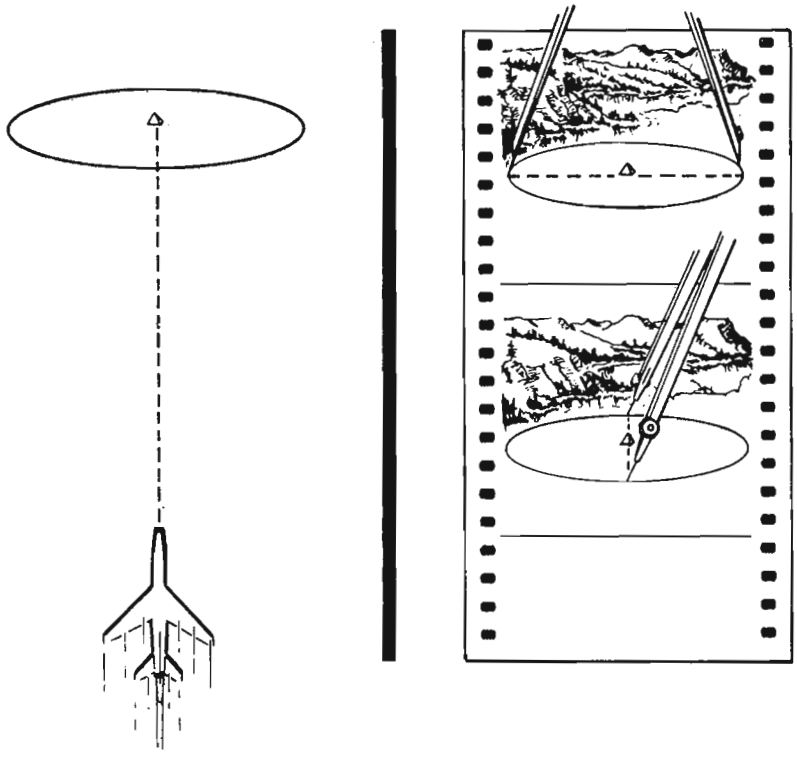


Figure 4-8. Method of Assessing Ground Attack Film

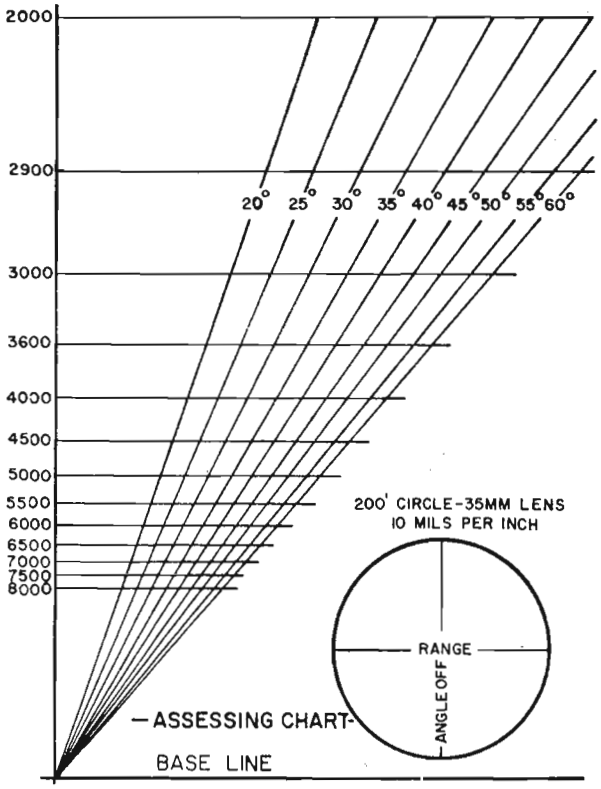


Figure 4-9. Assessing Chart

b. Assessing table or workbench upon which to mount the projector.

c. Projection screen.

d. Calipers.

e. Film reels.

f. Film rack storage.

g. Film assessing charts.

h. Magazine tilting assembly, locally manufactured from a standard gun camera. (Substitute 3-inches lens for 35 mm gun camera lens.)

Assessing Chart Construction. This paragraph deals primarily with construction of assessing charts for the 35 mm lens (procedures and formulas outlined are applicable to any gun camera lens, but it is necessary to substitute different values for the angle of projection of other lenses and target sizes). Charts presently in use are designed for a projection image with a scale of 10 mils per inch (although larger images would tend to promote accuracy in using the chart, poor film quality produces unacceptably poor target definition). Since the angular projection of the 35 mm lens is 214 mils, the arbitrarily selected scale of 10 mils per inch requires that the projector be positioned to achieve a projected frame or image 20.6 (20 5/8) inches in height. After this determination, charts are constructed to scale, thus permitting a direct transfer of measurement from the projected image on the screen to the assessing chart. The distance from the projector lens to the screen must be 44.5 inches). (See figure 4-11.) Computation for chart construction is accomplished in three steps (the third step is used only when angle-off or dive angle must be determined):

1. Determine target size, in mils, for a specified range. This may be accomplished by substituting into the formula:

$$\frac{\text{Target dimension x 1,000}}{\text{Range}} = \text{Target size in mils}$$

2. Convert target size, in mils to range in inches. To do this, substitute into the formula:

$$\frac{\text{Target size in mils}}{\text{Mils per inch on screen}} = \text{Range in inches}$$

3. Determine length of the minor axis of the aerial target, bombing circle, or strafe panel, in inches for the specified range and dive angle. (See figure 4-12.) Substitute into the formula:

$$\frac{\text{Target size in mils x Sine of dive angle}}{\text{Mils per inch on screen}} =$$

Minor axis, in inches

To perform necessary computations and construct a dart assessing chart, use 5 feet as the target dimension and appropriate selected ranges.

Substitute into the formula in step 1 to determine target size, in mils, for the selected ranges.

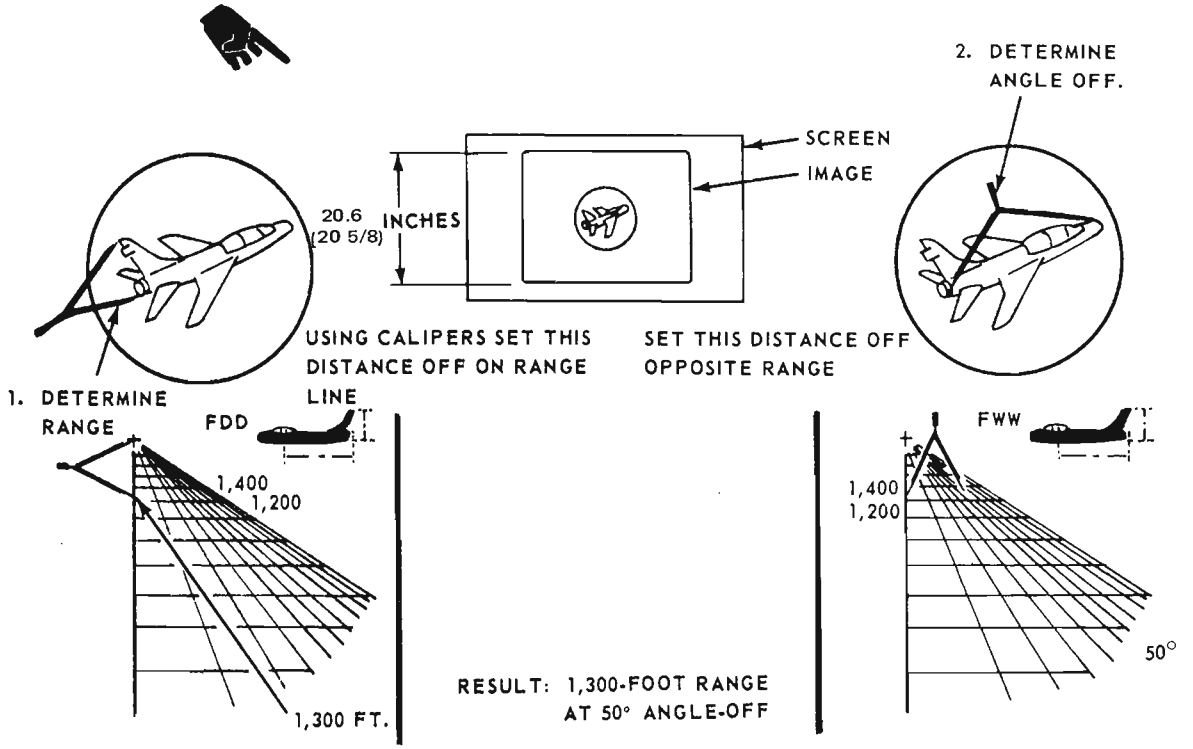


Figure 4-10. Film Assessment, Fighter vs. Aircraft Missions

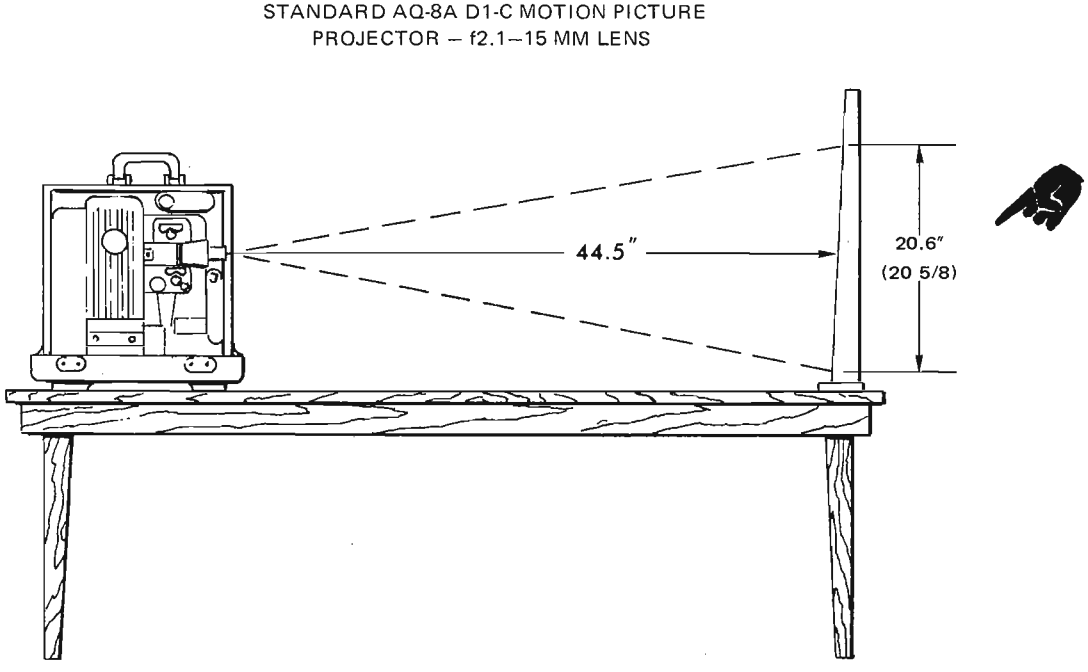
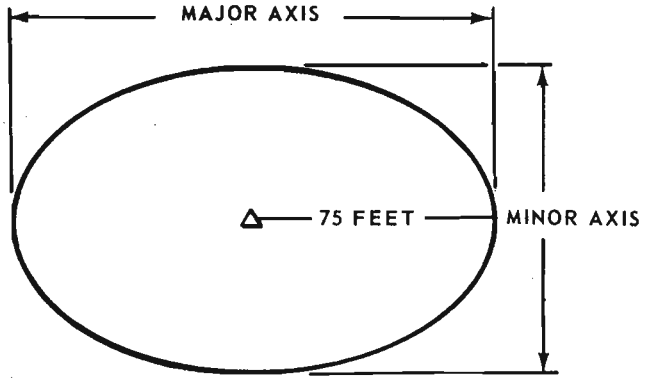
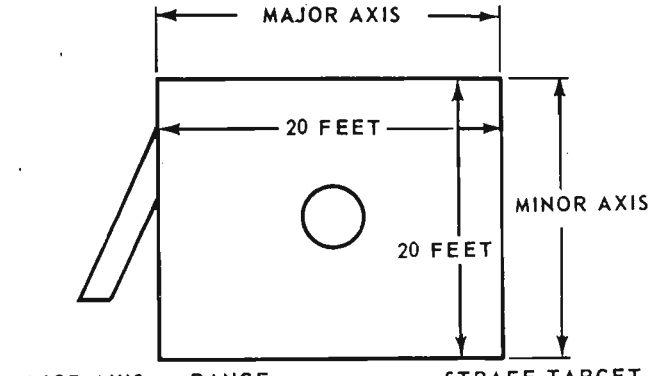


Figure 4-11. Assessing Equipment – General Layout

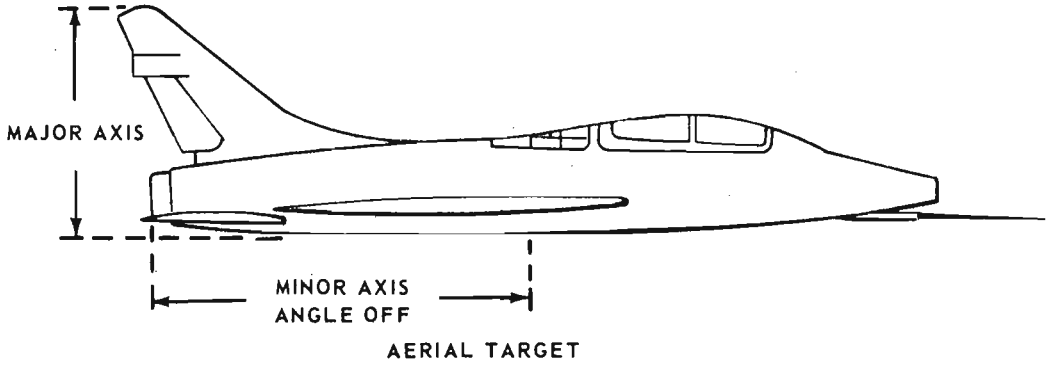


DIVE BOMBING AND ROCKETRY TARGET



MAJOR AXIS = RANGE
MINOR AXIS = DIVE ANGLE

STRAFE TARGET



AERIAL TARGET

Figure 4-12. Aerial Target

At the greater ranges, this chart is likely to produce major errors in measurement becuase of poor target definition and proximity of the range lines on the chart. With the dart target, this tendency to induce error has been accentuated because of target size, firing speeds, and firing ranges.

Since 10 mils represents 1 inch on the screen, move the decimal point one place to the left (dividing mil-values by 10) to complete step 2. The chart can now be constructed (as shown in figure 4-7), with all measurements taken from the baseline. When film assessing charts are constructed for aerial combat targets, complete step 3. For angle-off measurement, the dimension of a given portion of the fuselage length is the appropriate target length. The size of the portion used will depend upon the type of airplane photographed. (See aerial target in figure 4-12.)

To construct a dive bomb chart, use the same procedure to determine range lines; then substitute into the formula for step 3 to compute the length of the minor axis of the bombing circle for various dive angles. Although it will be necessary to compute these for only one selected range (range has a proportional relationship to dive angle), it is wise to check accuracy of work by computing dive angles for at least three ranges. In the construction phase, measurements for fixing the position of range lines must be taken from the baseline. After range lines have been drawn (as shown in figure 4-9), determine the points of intersection and draw in the dive-angle lines as shown (measurements will be made from the vertical line). The completed chart is shown in figure 4-9.

With chart computation accomplished and the assessing room organized, the role of the weapons officer in the film assessing program is only partially complete. For the film assessing program to be effective, records must be kept of all film taken and assessed. If this is done and film is assessed conscientiously, you can expect to receive a bonus of improved scores and greater overall effectiveness.

ERROR ANALYSIS.

Error Analysis Equation (Bombing and Rocketry). The following equation was derived to determine the impact error if the actual release parameters are different from the planned release parameters. The equation assumes that the original depression is not changed and that the tracking index is on the target at time of weapon release.

Equation:

$$E = BR_p - AG_p \quad \text{Cot} \left[\theta + \frac{SD - AAA}{17.778} \right]$$

where

a. E = Error (in feet). If E is positive, the impact is long or at 12 o'clock. Conversely, if E is negative, the error is short or at 6 o'clock.

b. BR_p = Bomb range in feet (corrected for horizontal and vertical parallax and impact point).

(1)Parallax correction is computed by use of the following equation:

BR_p = Actual bomb range — X parallax factor cos θ - Y parallax factor sin θ + impact point correction.

NOTE

X parallax factor = 15
Y parallax factor = 6

(2)As total parallax correction is a function of the dive angle, it may be precomputed to simplify use of the equation, as follows:

DIVE ANGLE (DEG)	X PARALLAX FACTOR	Y PARALLAX FACTOR	CORRECTION TO BOMB RANGE
5	-14.9	-0.5	-15.4
10	-14.8	-1.0	-15.8
15	-14.5	-1.5	-16.0
20	-14.1	-2.1	-16.1
25	-13.6	-2.5	-16.1
30	-13.0	-3.0	-16.0
35	-12.3	-3.4	-15.7
40	-11.5	-3.9	-15.4
45	-10.6	-4.2	-14.6
50	-9.6	-4.6	-14.2

(3)The data in the preceding table shows that parallax correction remains approximately 15 feet. Therefore, when applying parallax correction to bomb range, subtract 15 feet from the actual bomb range.

(4)The range impact correction is the distance short of the aimpoint that initial ordnance impact is desired. If this correction is computed into the depression from flight path presented in the ballistic tables, the distance will be stated on the bottom of the table. This distance must be added to the bomb range when determining BRp.

c. AG_p = Release altitude in feet (corrected for horizontal and vertical parallax).

(1)Parallax correction is computed by use of the following equation:

AG_p = Release altitude - X parallax factor Sin θ + Y parallax factor Cos θ

NOTE

X parallax factor = 15 feet
Y parallax factor = 6 feet

(2)As total parallax correction is a function of the dive angle, it may be precomputed to simplify use of the equation, as follows:

DIVE ANGLE (DEG)	X PARALLAX FACTOR	Y PARALLAX FACTOR	CORRECTION TO RELEASE ALTITUDE
5	-1.3	6.0	+4.7
10	-2.6	5.9	+3.3
15	-3.9	5.8	+1.9
20	-5.1	5.6	+0.5
25	-6.3	5.5	-0.8
30	-7.5	5.2	-2.3
35	-8.6	4.9	-3.7
40	-9.6	4.6	-5.0
45	-10.6	4.2	-6.4
50	-11.5	3.9	-7.6

d. Cot [ ] = Trigonometric value of the dive angle + effective depression.

(1) Effective depression is the amount of depression below the intended airplane flight path.

e. θ = Release angle (in degrees).

(1) For dive bombing, this value is always positive.

f. SD = Sight depression (in mils).

(1) This angle is the figure extracted from the bomb ballistics table for the desired release conditions plus the ECSL angle of attack (in mils).

g. AAA = Actual ECSL angle of attack (in mils).

(1) The ECSL angle of attack changes with a change in airspeed or dive angle. The new ECSL angle of attack must be subtracted from the VRDA setting in order to find the actual sight depression from flight path for the new set of release conditions.

h. 17.778 = Number of mils in a degree.

i. It should be apparent from the detailed discussion that the equation is matching the position of the airplane from the target (measured from a point directly below the airplane) with the actual bomb range. Thus, if the AGp Cot [ ] is greater than BRp the bomb hits short, and conversely, if BRp is greater the bomb hits long.

Error Analysis Data and Computations.

PARAMETERS.

NOTE

The following ballistics parameters for the BDU-23/B and SUU-21/A are extracted from the bomb tables and are used to describe the desired conditions from which deviations are made in the following analyses.

a. Weapon	BDU-23/B and SUU-21/A dispensers
b. Release altitude	3,000 feet
c. Release indicated airspeed	400 knots
d. Release true airspeed	440 knots
e. Dive angle	30 deg
f. Airplane gross weight	28,000 lb
g. Release temperature	+10° C
h. Target elevation	2,000 feet MSL
i. Angle of attack	-1 mil (ECSL)
j. Bomb range	3,914 feet
k. Impact point	On target
l. Slant range	4,931 feet
m.Depression below flight path	134 mils or 7° 32.4'

NOTE

As the desired impact point is on target, BR_p will be actual bomb range less horizontal parallax correction (15 feet) for the following examples.

Dive Angle Error. A change from the palnned dive angle will produce two errors: a ballistic (trajectory) error and a release-point range error. For the following example, assume that the airplane was in a 25-degree dive instead of 30-degree dive. Then, using the equation:

$$E = 4{,}516 - 2{,}999 \text{ Cot } \left[25° \frac{+133 - 5}{17.778} \right]$$

$$E = 4{,}516 - 2{,}999 \text{ Cot } [\,25° + 7° 27'\,]$$

$$E = 4{,}516 - 2{,}999 \times 1.5727$$

$$E = 4{,}516 - 4{,}716 = -200 \text{ feet (short)}$$

a. In the computation, it was necessary to correct the release altitude for parallax (from the precomputed table) and to compute a new angle of attack for a 25-degree dive (+0.5 mil instead of -1 mil).

b. The new bomb range was obtained from the ballistics table for a 25-degree dive (4,531). A 15-foot parallax correction was subtracted, with a resultant difference of 4,516 feet.

c. From the theory of error analysis, note that the two individual errors, release-point range and bomb trajectory, are partially canceling but that the release-point range is the greater of the two.

Airspeed Error. A change from the planned airspeed produces two errors — a release-point range error and a bomb trajectory error — both of which are cumulative. The following solution is for a release at an airspeed 20 knots faster than planned.

$$E = 3{,}965 - 2{,}998 \text{ Cot } \left[\,30° \frac{+133 - (-4)}{17.778}\,\right]$$

$$E = 3{,}965 - 2{,}998 \text{ Cot } [\,30° \; 7°42.6'\,]$$

$$E = 3{,}965 - 2{,}998 \times 1.2934$$

$$E = 3{,}965 - 3{,}878 = 87 \text{ feet (long)}$$

a. In the computation, it was necessary to correct the release altitude for parallax (from the precomputed table) and to compute a new angle of attack for the airspeed change (-4 mils instead of -1 mil).

b. The new bomb range was obtained from the ballistics table for a release TAS of 460 knots (3,980). A 15-foot parallax correction was subtracted, with a resultant difference of 3,965 feet.

Release Altitude Error. A 1-second early or late release will change the release altitude by approximately 500 feet. It will also cause two partially canceling errors: bomb trajectory and release-point range. The latter of the two will always be the greater. For a release made 500 feet lower than planned, the equation gives:

$$E = 3{,}350 - 2{,}498 \text{ COT } \left[30^{O} + \frac{133 - (-1)}{17.778}\right]$$

$$E = 3{,}350 - 2{,}498 \; [\text{COT } 30^{O} + 7^{O} 32.4']$$

$$E = 3{,}350 - 2{,}498 \text{ X } 1.3014$$

$$E = 3{,}350 - 3{,}247 = 103 \text{ feet (long)}$$

a. In the computation, the new release altitude (2,498) was used (3,000 - 500 - 2), the angle of attack remained constant, and the new bomb range was obtained from the ballistics table for a 2,500-foot release altitude. Also, a 15-foot parallax correction was applied (3,365 - 15).

Release-G Error. As previously stated, bomb ballistics are computed on the basis of the airplane being at a G-force equivalent to the cosine of the dive angle. Any deviation will change the airplane angle of attack, dive angle, release-point range, and bomb trajectory. The change in the airplane angle of attack, due to incremental positive or negative G-force changes, can be computed by use of a special equation. A change in dive angle depends upon the amount of time that the different G-force is applied.

For the following computation, assume the following:

a. The weapon is released with a G-force 1/4 G less than planned.

b. The application reduced G-force is held for a short period of time, resulting in a 5-degree increase in dive angle.

c. The other release parameters remain the same.

d. Based on these assumptions, the angle of attack would be −14 mils (reduced by 2 mils for the steeper dive angle and further reduced by 11 mils because of the 1/4 less G.)

e. Corrected bomb range for a 35-degree dive angle would be 3,366 feet (3,381 - 15).

f. Substituting into the equation:

$$E = 3{,}366 - 2{,}996 \text{ Cot } \left[\frac{35° + 133 - (-14)}{17.778}\right]$$

$$e \cong 3{,}366 - 2{,}996 \text{ Cot } [\,35° + 8° 16.2'\,]$$

$$E = 3{,}366 - 2{,}996 \times 1.0623$$

$$E = 3{,}366 - 3{,}182 = 184 \text{ feet (long)}$$

Bank Error. As the airplane rolls abouts its longitudinal axis, the tracking index rolls about a point centered on the airplane flight path. With the tracking index on the target at release, two errors are incurred: one laterally and one in range. For the following analyses, assumed that the airplane is in a 15-degree right bank at release.

NOTE

The computations for lateral and range error, although mathematically accurate, are not completely definitive. The values obtained will be sufficiently accurate for practical application, however.

DETERMINING LATERAL ERROR.

a. Obtain slant range from appropriate ballistics table (4,931 feet).

NOTE

This is a no-wind slant range.

b. Determine footage value (660 feet) subtended by angle formed between flight path and depressed sight line on a plane perpendicular to sight line.

$$X = \frac{\text{Mils depression x Slant range}}{1{,}000}$$

$$X = \frac{134 \times 4{,}931}{1{,}000}$$

$$X = 660 \text{ feet}$$

c. Determine lateral error (171 feet).

Error = Sine bank angle x Footage value or

$$\text{Sin } 15° = \frac{X}{660}$$

$$\text{Sin } 15° = .25882$$

$$X = .25882 \times 660 = 171 \text{ feet}$$

Error = 171 feet right

d. The entire computation method shown in steps b. and c. may now be written as the following formula:

$$E = \frac{\text{Sight depression below flight path (mils)} \times \text{Slant range} \times \text{Sine back angle}}{1{,}000}$$

DETERMINING RANGE ERROR (ALWAYS SHORT).

a. Find footage value (1,282) on ground subtended by angle formed between flight path and depressed sight line (lead for bomb trajectory).

$$X = T - \text{bomb range}$$

Bomb range = 3,914 feet (from bomb table)

$$\text{TAN } \theta = \frac{3{,}000}{T}$$

$$T = \frac{3{,}000}{\text{TAN } \theta\ (30°)}$$

$$T = \frac{3{,}000 = 5{,}196}{.57735}$$

$$X = 5{,}196 - 3{,}914 = 1{,}282$$

b. Find side b of triangle (1,238 feet) which is the reduced footage depression.

$$\text{COS A } (15°) = \frac{Y}{1{,}282}$$

$$.96593 = \frac{Y}{1{,}282}$$

$$Y = 1{,}282 \times .96593$$

$$Y = 1{,}238 \text{ feet}$$

c. Range error is equal to original depression footage of 1,282 feet (X) less the reduced depression footage of 1,238 feet (Y).

$$1{,}282 - 1{,}238 = 44 \text{ feet short}$$

Skid Error. Releasing in a skid with the tracking index on the target will result in lateral error. For a 1-degree skid, the error would be 87.7 feet. Figure 4-13 shows sideslip for varying airspeeds and ball-width displacements.

a. Use the formula:

$$\text{Error (feet)} = \frac{\text{Skid (mils) x Slant range (feet)}}{1000}$$

$$\text{Error} = \frac{17.778 \times 4{,}938 = 87.7}{1{,}000}$$

b. This compares favorably with an error of 91.6 feet for a 45-degree dive.

Wind Errors. Ten knots of unknown wind will cause an impact error of 107 feet for the selected delivery parameters. The error will always be downwind and applies to both rangewinds and crosswinds. This is computed by the following formula:

Error (feet) = Wind x cross ft/kt

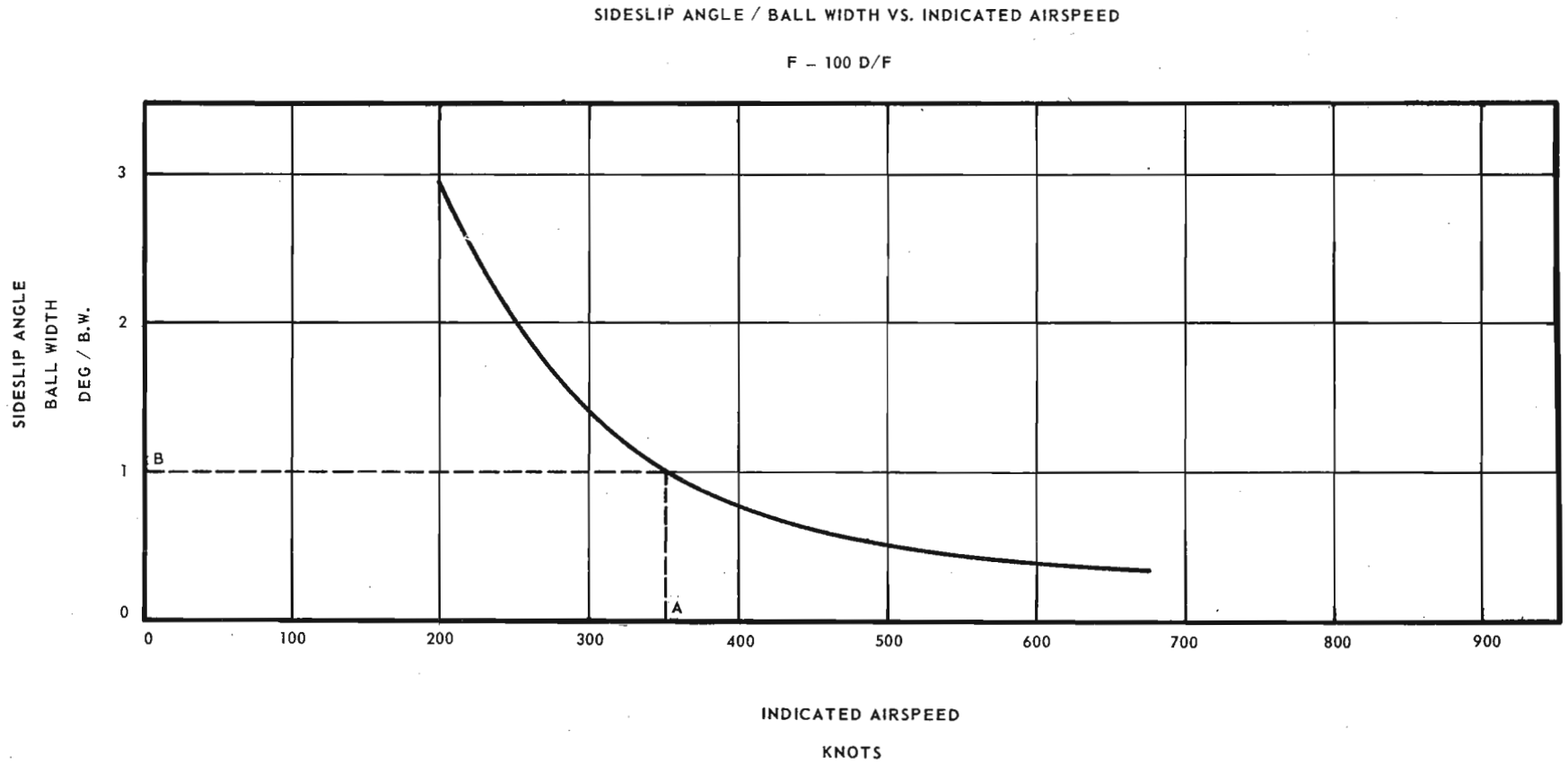
Error = 10 x 10.7

Error = 107 feet

Miscellaneous Errors.

GROSS WEIGHT. A change from the planned gross weight will change the effective depression. The change is approximately 1 mil per 1,000 pounds. As a rule of thumb for in-flight use, adjust the VRDA setting by adding 1 mil per 1,000 pounds above planned weight and subtracking 1 mil per 1,000 pounds below planned weight.

EJECTION FORCE. All munitions (except missiles and CBU series weapons) are force-ejected from the pylon or applicable dispenser. High-blow ejection force is 30,000 foot-pounds, and low-blow ejection force is 30,000 foot-pounds, and low-blow ejection force is 10,000 foot-pounds. Variance in ejection force is practically impossible to predict, but may be reduced by good pylon maintenance procedures. The one item that a pilot can insure is that the ejection force desired is properly set. A weapon impact error can be expected if the pylon slide valve is improperly positioned.



A = KNOTS INDICATED AIRSPEED

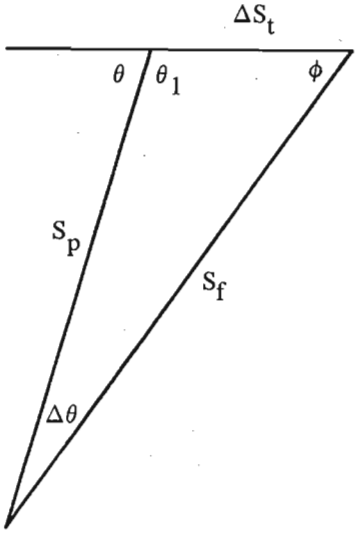
B = DEGREES SIDESLIP FOR ONE BALL WIDTH DEFLECTION

Figure 4-13. Sideslip Angle/Ball Width vs. Indicated Airspeed.

PURSUIT CURVE FORMULA DERIVATIONS AND CALCULATIONS.

Derivation of the expression for fighter turn rate in pursuit curve attack, where

ω = turn rate (radians/secs),
V_t = target velocity (ft/sec),
θ = angle off,
S = range (ft),
S_p = present range (ft),
S_f = future range (ft),
ΔS_t = distance target travels (ft),



4-14. Derivation of the Expression For Fighter Turn Rate in Pursuit Curve Attack

From figure 4–14 and the law of sines:

$$\frac{\text{Sin } \Delta\theta}{\Delta S_t} = \frac{\text{Sin } \theta 1}{S_f} = \frac{\text{Sin } \theta}{S_f}$$

or

$$\text{Sin } \Delta\theta = \frac{\Delta S_t \text{ Sin } \theta}{S_f}$$

Now if we let $\Delta\theta \rightarrow 0$ we can say $\Delta\theta \rightarrow d\theta$, $\Delta S_t \rightarrow dS_t$, and $S_f \rightarrow S_p = S$.

Hence:

$$\text{Sin } d\theta = \frac{dS_t \text{ Sin } \theta}{S}.$$

Since

$$\lim_{d\theta \rightarrow 0} \frac{\text{Sin } d\theta}{d\theta} =$$

we may write

$$d\theta = \frac{dS_t \text{ Sin } \upsilon}{S},$$

or

$$\frac{d\theta}{dt} = \frac{dS_t}{dt} \frac{\text{Sin } \theta}{S}.$$

Since

$$\frac{dS_t}{dt} = V_t$$

$$\frac{d\theta}{dt} = \frac{V_t \text{ Sin } \theta}{S} = \omega,$$

or

$$\boxed{\omega = \frac{V_t \text{ Sin } \theta}{S}}$$

Derivation of range in a pursuit curve, where

S = range,
V_f = fighter velocity,
V_t = target velocity,
θ = angle off,
N = radial G,
a = radial acceleration.

From the preceding derivation we have

$$\omega = \frac{V_t \text{ Sin } \theta}{S} \qquad (1)$$

Also, turn rate may be expressed as

$$\omega = \frac{a}{V_f}$$

Since

$$a = gN = 32.2N,$$

where

g = acceleration due to gravity,

we may write

$$\omega = \frac{32.2N}{V_f} \qquad (2)$$

Combining (1) and (2), we have

$$\boxed{S = \frac{V_f V_t \sin \theta}{32.2N}}$$

Derivation of range in a pursuit curve, where initial range is known, and

S = range at any angle off,

S_o = range at 90° angle off,

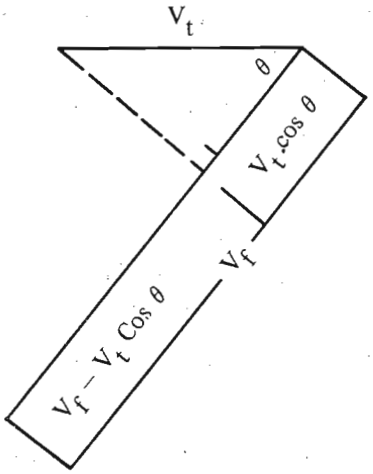


Figure 4-15. Derivation of Range in a Pursuit Curve, Where Initial Range is Known

To solve for range, we first find rate of closure, $\frac{dS}{dt}$. From figure 4–15, we have

$$\frac{dS}{dt} = V_f - V_t \cos \theta \qquad (1)$$

Assuming V_f and V_t constant, we have 3 variables (dS, dt, and θ). To proceed in the derivation we must evaluate one in terms of another. Therefore, we write

$$\frac{dS}{dt} = \frac{dS}{d\theta} \frac{d\theta}{dt} \qquad (2)$$

Knowing

$$\frac{d\theta}{dt} = \frac{V_t \sin \theta}{S}, \qquad (3)$$

we may combine (2) and (3), then substitute into (1), to obtain

$$\frac{dS}{S} = \left(\frac{V_f}{V_t} \csc \theta - \frac{\cos \theta}{\sin \theta} \right) d\theta \qquad (4)$$

Integrating (4):

$$\ln S = \frac{V_f}{V_t} = \ln (\csc \theta - \cot \theta) - \ln \sin \theta + C \qquad (5)$$

To evaluate the constant C, let

$$S = S_o$$

when

$$\theta = \frac{\pi}{2} = 90°.$$

Substituting these values into (5), we obtain

$$\ln S_o = \frac{V_f}{V_t} \ln (1 - 0) - \ln(1) + C.$$

Now

$$\ln 1 = 0, \text{ so } C = \ln S_o .$$

Hence,

$$\ln S = \ln \left[\frac{(\csc \theta - \cot \theta)^{\frac{V_f}{V_t}} S_o}{\sin \theta} \right]$$

or

$$S = S_o \frac{[\csc \theta - \cot \theta]^{\frac{V_f}{V_t}}}{\sin \theta}$$

Let

$$K = \frac{V_f}{V_t}$$

Since

$$\text{Csc } \theta - \text{Cot } \theta = \frac{1 - \text{Cos } \theta}{\text{Sin } \theta} = \text{Tan} \frac{\theta}{2},$$

we may write

$$\boxed{S = \frac{S_o \left[\text{Tan} \frac{\theta}{2} \right] K}{\text{Sin } \theta}} \quad (6)$$

Derivation of radial G in a pursuit curve.

To find radial G (N) we make use of the expression

$$S = \frac{V_f V_t \text{ Sin } \theta}{32.2N} \quad (1)$$

Substituting S_o for S and 90° for θ in (1), we obtain

$$S_o = \frac{V_f V_t}{32.2N_o}. \quad (2)$$

Now by substituting (1) and (2) into (6) of the previous derivation we have

$$\boxed{N = \frac{N_o (\text{Sin}^2 \theta)}{(\text{Tan} \frac{\theta}{2})^K}} \quad (3)$$

Derivation of Max G Formula.

We begin with the expression for ω,

$$\omega = \frac{V_t \text{ Sin } \theta}{S}$$

To find the angle of where Max G occurs, (θ_m), we must first differentiate ω with respect to time

$$\frac{d\omega}{dt} = \frac{V_t}{S^2} \left[S \text{ Cos } \theta \frac{d\theta}{dt} - \text{Sin } \theta \frac{dS}{dt} \right] \quad (1)$$

To solve for Max G, we set

$$\frac{d\omega}{dt} = 0$$

or

$$0 = S \text{ Cos } \theta \frac{d\theta}{dt} - \text{Sin } \theta \frac{dS}{dt} \quad (2)$$

Knowing

$$\frac{d\theta}{dt} = \frac{V_t \text{ Sin } \theta}{S}$$

and

$$\frac{dS}{dt} = V_f - V_t \text{ Cos } \theta,$$

we may substitute these expressions into (2) and obtain

$$0 = 2 V_t \text{ Cos } \theta - V_f.$$

Rearranging:

$$\boxed{\theta_m = \text{arc Cos} \left(\frac{V_f}{2V_t} \right)} \quad (3)$$

Derivation of G times rate of change (N).

From equation (1) in the previous derivation, we have

$$\frac{d\omega}{dt} = \frac{V_t}{S^2} \left[S \text{ Cos } \theta \frac{d\theta}{dt} - \text{Sin } \theta \frac{dS}{dt} \right] \quad (1)$$

Using the derived expressions for $\frac{d\theta}{dt}$ and $\frac{dS}{dt}$ and inserting them into the above formula we have

$$\frac{d\omega}{dt} = \frac{V_t \text{ Sin } \theta}{S^2} \left[2 V_t \text{ Cos } \theta - V_f \right] \quad (2)$$

To find N, we rearrange the following equation:

$$\omega = \frac{32.2N}{V_f}, \text{ so that } N = \frac{V_f \omega}{32.2}$$

Now differentiating N with respect to time, we have

$$\frac{dN}{dt} = \frac{V_f}{32.2} \frac{d\omega}{dt} \quad (3)$$

Combining equations (2) and (3),

$$\frac{dN}{dt} = \frac{V_f V_t \text{ Sin } \theta}{32.2S^2} \left[2 V_t \text{ Cos } \theta - V_f \right] \quad (4)$$

Combining the expression

$$S = \frac{V_f V_t \text{ Sin } \theta}{32.2N}$$

with (4) we have

$$\frac{dN}{dt} = \frac{N}{S}\left[2 V_t \text{ Cos } \theta - V_f\right].$$

If we let

$$\frac{dN}{dt} = \dot{N},$$

we have

$$\boxed{\dot{N} = \frac{N}{S}\left[2 V_t \text{ Cos } \theta - V_f\right].}$$

Derivation of radian or mil lead for target motion.

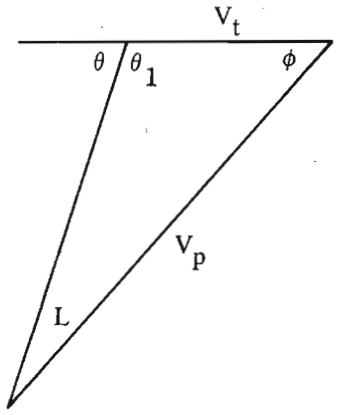


Figure 4-16. Derivation of Radian or Mil Lead For Target Motion

where

L = lead for target motion (radians).
V_t = target velocity,
V_p = projectile velocity (average).
θ = angle off.

By the law of sines and figure 4-16, we have

$$\text{Sin L} = \frac{V_t \text{ Sin } \theta_1}{V_p}$$

Since

$$\text{Sin } \theta_1 = S\,\theta$$

$$\text{Sin L} = \frac{V_t \text{ Sin } \theta}{V_p}$$

For small angles the equation may be written

$$L = \frac{V_t \text{ Sin } \theta}{V_p}$$

or, if we desire mil lead (Lm),

$$Lm = \frac{V_t \text{ Sin } \theta\ (1000)}{V_p}.$$

Derivation of range in lead pursuit curve, where initial range is known.

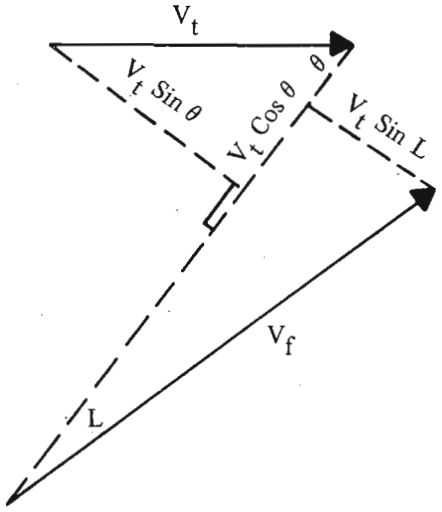


Figure 4-17. Derivation of Range in Lead Pursuit Curve, Where Initial Range is Known

By referring to figure 4–17, we note that rate of closure, $\frac{dS}{dt}$ on a lead pursuit curve may be written as

$$\frac{dS}{dt} = V_f \text{ Cos L} - V_t \text{ Cos } \theta. \qquad (1)$$

From the derivation of lead angle, we know

$$\text{Sin L} = \frac{V_t \text{ Sin } \theta}{V_p}$$

since

$$\text{Cos L} = \sqrt{1 - \text{Sin}^2 \text{ L}},$$

then

$$\text{Cos L} = \sqrt{1 - \frac{V_t^2}{V_p^2} \text{ Sin}^2 \theta}.$$

If we let

$$k = \frac{V_t}{V_p},$$

then

$$\text{Cos L} = \sqrt{1 - k^2 \text{ Sin}^2 \theta}$$

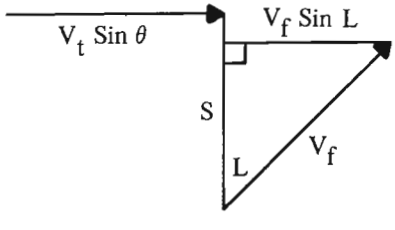
and

$$\frac{dS}{dt} = V_f \sqrt{1 - k^2 \text{ Sin}^2 \theta} - V_t \text{ Cos } \theta. \quad (2)$$

since

$$\frac{dS}{dt} = \frac{dS}{d\theta} \frac{d\theta}{dt} \quad (3)$$

We need only find $\frac{d\theta}{dt}$ to set up a differential equation for integration. We may find $\frac{d\theta}{dt}$ by protecting V_t and V_f in a direction, perpendicular to the turning point at any distance (S) from the target aircraft. If we let $t \to 0$ and construct a new diagram from the original, we have



where $V_t \text{ Sin } \theta$ and $V_f \text{ Sin } L$ are in the same direction at a perpendicular distance, S. The rate of turn $\frac{d\theta}{dt}$ will be the difference of the projected velocities, $V_t \text{ Sin } \theta$ and $V_f \text{ Sin } L$, divided by the distance, S. Hence

$$\frac{d\theta}{dt} = \frac{V_t \text{ Sin } \theta - V_f \text{ Sin } L}{S} .$$

Since

$$\text{Sin } L = \frac{V_t \text{ Sin } \theta}{V_p}$$

we may combine the two expressions and write

$$\frac{d\theta}{dt} = \frac{V_t \text{ Sin } \theta}{S} \left[1 - \frac{V_f}{V_p} \right]$$

Since

$$\frac{V_f}{V_p} = \frac{V_f}{V_t} \frac{V_t}{V_p} = Kk ,$$

we may write

$$\frac{d\theta}{dt} = \frac{V_t \text{ Sin } \theta}{S} \left[1 - Kk \right] \tag{4}$$

By combining (3) and (4) and substituting into (2), we have

$$\boxed{\frac{dS}{S} = \left[\left(\frac{K}{1 - Kk} \right) \frac{\sqrt{1 - k^2 \text{ Sin}^2 \theta}}{\text{Sin } \theta} - \frac{\text{Cos } \theta}{(1 - Kk) \text{ Sin } \theta} \right] d\theta} \tag{5}$$

Integrating (5):

$$\ln S = \left(\frac{Kk}{1 - Kk} \right) \ln \frac{1 - k}{\sqrt{1 - k^2 \text{ Sin}^2 \theta} - k \text{ Cos } \theta}$$

$$+ \left(\frac{K}{1 - Kk} \right) \ln \left(\frac{\text{Sin } \theta \sqrt{1 - k^2}}{\cos \theta + 1 - k^2 \text{ Sin}^2 \theta} \right)$$

$$- \left(\frac{1}{1 - Kk} \right) \ln \text{Sin } \theta + C \tag{6}$$

To evaluate the integration constant, C, we let

$$S = S_o \, , \quad \theta = \frac{\pi}{2}$$

Then

$$\ln S_o = \left(\frac{Kk}{1 - Kk}\right) \ln \left(\frac{1 - k}{\sqrt{1 - k^2}}\right) + C;$$

hence,

$$C = \ln S_o \left(\frac{\sqrt{1 - k^2}}{1 - k}\right)^{\left(\frac{Kk}{1 - Kk}\right)} \tag{7}$$

Combining (6) and (7) we have

$$S = \frac{S_o}{\left(\frac{1}{1 - Kk}\right)} \left[\frac{\sqrt{1 - k^2}}{\sqrt{1 - k^2 \sin^2 \theta} - k \cos \theta}\right]^{\left(\frac{Kk}{1 - Kk}\right)} \left[\frac{\sin \theta \sqrt{1 - k^2}}{\cos \theta + \sqrt{1 - k^2 \sin^2 \theta}}\right]^{\left(\frac{K}{1 - Kk}\right)}$$

$$\sin \theta$$

which is defined for

$$0 \leq k < 1$$

$$0 \leq Kk < 1$$

Derivation of Radial G for a lead pursuit curve.

To find N we combine the following expressions:

$$\frac{d\theta}{dt} = \frac{V_t \sin \theta}{S} \left[1 - Kk\right]$$

and

$$\frac{d\theta}{dt} = \frac{32.2N}{V_f},$$

to obtain

$$S = \frac{V_f V_t \sin \theta \, (1 - Kk)}{32.2N}$$

Substituting S_o for S, N_o for N, and $\frac{\pi}{2}$ for θ in (1)

$$S_o = \frac{V_f V_t (1 - Kk)}{32.2 N_o} \tag{2}$$

Now by combining (1) and (2) with the previous derivation for range in a lead pursuit curve, we have

$$N = N_o \operatorname{Sin}\theta \left(\frac{2 - Kk}{1 - Kk}\right) \left[\frac{\sqrt{1 - k^2 \operatorname{Sin}^2\theta} - k \operatorname{Cos}\theta}{\sqrt{1 - k^2}}\right]^{\left(\frac{Kk}{1 - Kk}\right)} \left[\frac{\operatorname{Cos}\theta + \sqrt{1 - k^2 \operatorname{Sin}^2\theta}}{\operatorname{Sin}\theta \sqrt{1 - k^2}}\right]^{\left(\frac{K}{1 - Kk}\right)} \tag{3}$$

If we know the ratio of S_o at any angle, we may combine (1) and (2), and write

$$\frac{N}{N_o} = \frac{S_o}{S} (\operatorname{Sin}\theta)$$

Derivation of the angle off where Max G occurs on a lead pursuit curve.

Given:

$$\omega = \frac{V_t \operatorname{Sin}\theta}{S} \left[1 - Kk\right]$$

To find θ where Max G occurs we must differentiate ω with respect to time:

$$\frac{d\omega}{dt} = \frac{V_t (1 - Kk)}{S^2} \left[S \operatorname{Cos}\theta \frac{d\theta}{dt} - \operatorname{Sin}\theta \frac{dS}{dt}\right]$$

To find the Max G point we set

$$\frac{d\omega}{dt} = 0 ,$$

or

$$0 = S \operatorname{Cos}\theta \frac{d\theta}{dt} - \operatorname{Sin}\theta \frac{dS}{dt}$$

Using the derived expressions for $\frac{d\theta}{dt}$ and $\frac{dS}{dt}$ in a lead pursuit curve and injecting them into the above formula we have

$$0 = V_t \operatorname{Cos}\theta (1 - Kk) - V_f \sqrt{1 - k^2 \operatorname{Sin}^2\theta} + V_t \operatorname{Cos}\theta .$$

Now, by rearranging

$$V_t \operatorname{Cos}\theta \left[2 - Kk\right] = V_f \sqrt{1 - k^2 \operatorname{Sin}^2\theta}$$

Squaring both sides

$$V_t^2 \cos^2 \theta \left[4 - 4Kk + K^2 k^2\right] = V_f^2 \left[1 - k^2 \sin^2 \theta\right], \text{ and}$$

remembering that

$$\sin^2 \theta = 1 - \cos^2 \theta ,$$

we have

$$V_t^2 \cos^2 \theta \left[4 - 4Kk + K^2 k^2\right] = V_f^2 \left[1 - k^2\right] + V_f^2 k^2 \cos^2 \theta .$$

Using the relation $K = \frac{V_f}{V_t}$, and solving for Cos θ, we have

$$\cos = \frac{V_f}{2V_t} \sqrt{\frac{1 - k^2}{1 - Kk}}$$

Hence the angle off (θ_m) where Max G occurs is given by

$$\theta_m = \arccos \left[\frac{V_f}{2V_t} \sqrt{\frac{1 - k^2}{1 - Kk}}\right]$$

PURE PURSUIT AND LEAD PURSUIT DATA.

Figures 4–18 through 4–29 contain pure pursuit and lead pursuit data.

PURE PURSUIT DATA

S/S_o

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.504	0.395	0.310	0.243	0.190	0.149	0.117	0.092	0.072	0.056	0.044
20	0.516	0.433	0.364	0.306	0.258	0.216	0.182	0.153	0.129	0.108	0.067
30	0.536	0.470	0.412	0.361	0.316	0.277	0.243	0.213	0.187	0.164	0.144
40	0.566	0.512	0.463	0.418	0.378	0.342	0.309	0.279	0.252	0.228	0.206
50	0.609	0.564	0.523	0.484	0.449	0.416	0.385	0.357	0.331	0.306	0.284
60	0.667	0.631	0.597	0.565	0.535	0.507	0.479	0.454	0.430	0.407	0.385
70	0.745	0.719	0.694	0.670	0.646	0.624	0.602	0.581	0.560	0.541	0.522
80	0.852	0.837	0.823	0.808	0.794	0.780	0.767	0.754	0.740	0.728	0.715
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	0.667	0.606	0.544	0.480	0.416	0.351	0.287	0.224	0.162	0.099	

Figure 4-18

PURE PURSUIT DATA

N/N_o

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.345	0.440	0.561	0.716	0.913	1.165	1.487	1.897	2.420	3.088	3.939
20	0.663	0.789	0.939	1.117	1.328	1.580	1.879	2.235	2.659	3.163	3.762
30	0.933	1.064	1.214	1.385	1.580	1.802	2.056	2.346	2.676	3.052	3.482
40	1.135	1.256	1.389	1.537	1.701	1.882	2.082	2.303	2.548	2.819	3.119
50	1.258	1.358	1.466	1.582	1.708	1.843	1.989	2.147	2.317	2.501	2.699
60	1.299	1.372	1.450	1.532	1.618	1.710	1.806	1.908	2.016	2.130	2.250
70	1.261	1.307	1.354	1.403	1.454	1.507	1.562	1.618	1.677	1.738	1.801
80	1.156	1.176	1.197	1.218	1.240	1.262	1.284	1.307	1.330	1.354	1.377
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	1.299	1.377	1.470	1.582	1.718	1.883	2.088	2.348	2.689	3.166	

Figure 4-19

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.1$$

S/S_o

θ	$K\ (\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.469	0.354	0.266	0.198	0.146	0.107	0.078	0.057	0.041	0.029	0.020
20	0.481	0.393	0.320	0.258	0.208	0.167	0.133	0.105	0.083	0.065	0.051
30	0.502	0.430	0.367	0.312	0.264	0.223	0.187	0.157	0.131	0.108	0.089
40	0.534	0.473	0.419	0.369	0.325	0.285	0.249	0.217	0.188	0.163	0.140
50	0.578	0.528	0.480	0.437	0.396	0.358	0.323	0.291	0.261	0.234	0.209
60	0.639	0.598	0.559	0.521	0.485	0.451	0.419	0.388	0.359	0.331	0.305
70	0.723	0.692	0.662	0.632	0.604	0.575	0.548	0.521	0.495	0.470	0.445
80	0.838	0.820	0.802	0.784	0.766	0.748	0.730	0.712	0.695	0.677	0.659
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	0.628	0.557	0.483	0.409	0.333	0.259	0.186	0.114	0.035		

Figure 4-20

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.1$$

N/N_O

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.370	0.490	0.654	0.878	1.187	1.616	2.217	3.064	4.269	5.995	8.492
20	0.710	0.870	1.070	1.323	1.644	2.053	2.577	3.252	4.128	5.271	6.772
30	0.995	1.162	1.362	1.602	1.892	2.243	2.670	3.191	3.830	4.619	5.595
40	1.204	1.358	1.535	1.741	1.980	2.259	2.585	2.968	3.419	3.952	4.585
50	1.325	1.452	1.595	1.755	1.935	2.139	2.371	2.634	2.933	3.275	3.668
60	1.355	1.448	1.550	1.662	1.784	1.919	2.068	2.232	2.413	2.615	2.839
70	1.301	1.358	1.420	1.486	1.557	1.633	1.715	1.803	1.897	2.000	2.110
80	1.175	1.201	1.228	1.256	1.285	1.316	1.348	1.382	1.418	1.455	1.495
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	1.356	1.462	1.595	1.763	1.981	2.271	2.670	3.256	4.271		

Figure 4-21

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.2$$

S/S_O

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.435	0.312	0.221	0.153	0.104	0.069	0.045	0.028	0.017	0.010	0.006
20	0.447	0.352	0.273	0.209	0.158	0.117	0.085	0.061	0.043	0.029	0.020
30	0.469	0.389	0.320	0.260	0.209	0.166	0.130	0.101	0.076	0.057	0.042
40	0.501	0.433	0.372	0.316	0.267	0.223	0.184	0.150	0.121	0.097	0.076
50	0.546	0.489	0.435	0.384	0.337	0.293	0.253	0.217	0.184	0.154	0.128
60	0.610	0.562	0.516	0.471	0.428	0.387	0.347	0.310	0.275	0.242	0.211
70	0.698	0.662	0.625	0.589	0.553	0.517	0.482	0.447	0.412	0.379	0.346
80	0.822	0.800	0.778	0.755	0.731	0.707	0.683	0.657	0.632	0.605	0.578
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	0.587	0.504	0.418	0.330	0.243	0.159	0.077				

Figure 4-22

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.2$$

N/N_O

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.399	0.556	0.787	1.137	1.676	2.525	3.898	6.177	10.074	16.957	29.551
20	0.765	0.973	1.253	1.637	2.170	2.923	4.007	5.600	7.991	11.668	17.472
30	1.067	1.285	1.563	1.921	2.389	3.008	3.839	4.972	6.545	8.769	11.981
40	1.284	1.484	1.730	2.032	2.410	2.885	3.490	4.271	5.294	6.636	8.491
50	1.402	1.567	1.763	1.995	2.274	2.611	3.023	3.530	4.163	4.962	5.984
60	1.420	1.541	1.679	1.839	2.024	2.239	2.493	2.793	3.152	3.584	4.111
70	1.346	1.420	1.503	1.596	1.700	1.818	1.951	2.104	2.278	2.480	2.716
80	1.198	1.231	1.266	1.305	1.347	1.393	1.443	1.498	1.559	1.627	1.703
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	1.425	1.571	1.766	2.036	2.422	3.010	4.012				

Figure 4-23

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.3$$

S/S_o

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.401	0.269	0.174	0.108	0.064	0.035	0.018	0.009	0.004	0.002	0.001
20	0.413	0.308	0.224	0.158	0.107	0.070	0.043	0.025	0.014	0.007	0.003
30	0.434	0.346	0.269	0.205	0.151	0.108	0.074	0.049	0.030	0.017	0.010
40	0.467	0.390	0.320	0.258	0.203	0.156	0.116	0.084	0.057	0.038	0.023
50	0.513	0.447	0.383	0.324	0.270	0.220	0.175	0.135	0.101	0.073	0.050
60	0.579	0.522	0.467	0.412	0.360	0.309	0.261	0.216	0.174	0.137	0.103
70	0.672	0.627	0.582	0.536	0.489	0.442	0.395	0.348	0.302	0.257	0.213
80	0.805	0.777	0.748	0.718	0.685	0.651	0.615	0.577	0.537	0.495	0.450
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	0.545	0.447	0.346	0.244	0.145	0.053					

Figure 4-24

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.3$$

N/N_o

θ	$K\ (\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.434	0.645	0.997	1.609	2.726	4.892	9.394	19.540	44.716		
20	0.829	1.110	1.528	2.171	3.198	4.914	7.936	13.589	24.961	71.450	
30	1.152	1.447	1.857	2.442	3.303	4.619	6.713	10.214	16.414	28.184	52.482
40	1.378	1.649	2.007	2.491	3.161	4.117	5.528	7.696	11.187	17.131	27.966
50	1.493	1.716	1.998	2.362	2.841	3.487	4.382	5.663	7.568	10.530	15.397
60	1.496	1.658	1.856	2.100	2.407	2.801	3.317	4.009	4.968	6.342	8.399
70	1.399	1.498	1.615	1.754	1.921	2.125	2.378	2.698	3.113	3.663	4.417
80	1.224	1.267	1.316	1.372	1.437	1.512	1.601	1.706	1.834	1.991	2.189
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	1.508	1.716	2.021	2.497	3.305	4.954					

Figure 4-25

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.4$$

S/S_o

θ	$K\dot{} \left(\frac{V_F}{V_T}\right)$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.365	0.223	0.126	0.065	0.030	0.012	0.004	0.001			
20	0.377	0.262	0.172	0.105	0.059	0.029	0.012	0.004	0.001		
30	0.398	0.299	0.214	0.145	0.092	0.053	0.027	0.012	0.004	0.001	
40	0.431	0.342	0.263	0.193	0.134	0.087	0.051	0.026	0.011	0.003	0.001
50	0.478	0.399	0.325	0.255	0.192	0.136	0.090	0.053	0.027	0.011	0.003
60	0.545	0.477	0.409	0.341	0.276	0.213	0.156	0.106	0.064	0.033	0.013
70	0.642	0.587	0.529	0.468	0.406	0.342	0.277	0.213	0.152	0.097	0.051
80	0.785	0.749	0.710	0.668	0.621	0.568	0.510	0.446	0.375	0.298	0.216
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	0.500	0.384	0.265	0.148	0.043						

Figure 4-26

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.4$$

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.476	0.778	1.374	2.666	5.836	14.945	47.163				
20	0.907	1.307	1.994	3.262	5.836	11.731	27.539	80.020			
30	1.255	1.675	2.335	3.441	5.443	9.435	18.481	42.828			
40	1.492	1.877	2.445	3.330	4.796	7.430	12.687	24.764	58.518		
50	1.603	1.918	2.359	3.004	3.997	5.630	8.558	14.443	28.308	69.437	
60	1.588	1.816	2.120	2.538	3.142	4.057	5.546	8.198	13.549	26.475	67.630
70	1.463	1.601	1.777	2.006	2.316	2.751	3.395	4.416	6.193	9.720	18.273
80	1.255	1.315	1.386	1.475	1.587	1.733	1.930	2.207	2.624	3.303	4.560
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
θ_m	1.612	1.922	2.445	3.442	5.899						

Figure 4-27

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.5$$

S/S_o

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.329	0.174	0.078	0.028	0.007						
20	0.340	0.211	0.116	0.054	0.019	0.005					
30	0.361	0.247	0.153	0.083	0.037	0.012					
40	0.393	0.289	0.197	0.121	0.063	0.025					
50	0.439	0.345	0.255	0.173	0.103	0.050	0.017				
60	0.508	0.423	0.337	0.251	0.170	0.098	0.043	0.011			
70	0.608	0.537	0.460	0.377	0.289	0.199	0.114	0.045			
80	0.761	0.713	0.658	0.594	0.517	0.427	0.320	0.197	0.075		
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
θ_m	0.453	0.314	0.173	0.048							

Figure 4-28

LEAD PURSUIT DATA

$$k = \frac{V_T}{V_P} = 0.5$$

N/N_o

θ	K $(\frac{V_F}{V_T})$										
(deg)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
10	0.529	0.999	2.213	6.155	24.073						
20	1.006	1.622	2.949	6.358	17.713	74.334					
30	1.386	2.028	3.264	6.018	13.606	42.624					
40	1.638	2.224	3.260	5.331	10.271	25.724					
50	1.743	2.221	3.005	4.433	7.445	15.386	45.707				
60	1.706	2.047	2.572	3.449	5.101	8.822	20.062	78.899			
70	1.545	1.749	2.043	2.494	3.255	4.726	8.267	20.993			
80	1.295	1.381	1.496	1.659	1.904	2.308	3.082	4.989	13.074		
90	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
θ_m	1.747	2.246	3.298	6.370							

AIM-9B/E/J MISSILE MANEUVERING ENVELOPES.

For information on maneuvering envelopes and high-G missile launchers for the AIM-9 missile, refer to Classified Supplement, T.O. 1F-100D(I)-34-1-1B.

2.75-INCH ROCKET FLECHETTE WARHEAD IMPACT PATTERN AND MISSION PLANNING DATA.

For information on the flechette warhead impact pattern and mission planning data, refer to Classified Supplement, T.O. 1F-100D(I)-34-1-1B.

CBU SERIES DISPENSERS.

For information on pattern dimensions and densities and bomblet effectiveness for various CBU dispensers, refer to Classified Supplement, T.O. 1F-100D(I)-34-1-1B.

CBU-24( ), CBU-29( ), CBU-49( ), CBU-52( ), CBU-53( ), CBU-54( ), CBU-58( ), AND CBU-71( ) CLUSTER DISPENSERS

For information on minimum release altitudes and impact pattern diameters for these cluster dispensers, refer to Classified Supplement T.O. 1F-100D(I)-34-1-1B.

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CORRECTION NOTICE

This correction notice is issued to show corrected "A" page of T.O. 1F-100C(I)-34-1-1, Change 2, dated 31 October 1976.

(Destroy CORRECTION NOTICE after compliance.)